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## Wave 2 Assignments

Needs:

-better impact defense to the debt ceiling – Abhi

***-AT: Bataille – DML***

-US space leadership good – space launch services – Tod

-impacts to unemployment (economic and non-economic) and economic leadership – look @ Westminster’s capitalism good aff from the social services topic

-at: environmental securitization – DML

-Global climate agreement advantage – I have a card about how SPS could be key to future climate negotiations. This is a possible US key approach – unless the US is involved, those agreements will fail.

-AT: asteroid detection DA – Block

-control of energy key – energy exporting good, trade deficit bad, electricity dependence bad (not just oil) – Myra and HP

***-only US aerospace industry can develop – Neaylon***

***-government spending good – Liam***

-competitiveness good (more aerospace specific the better) – Henderson

-STEM education good – Fabiola

-Impacts to the trade deficit – Klopp

-AT: Japan DA – soft power bad, alt causes, take outs to their economy – Abhi

## \*\*\*Aerospace Competitiveness Advantage\*\*\*

### Advantage \_\_ - Aerospace Competitiveness

### Global development of SPS is inevitable – US inaction collapses aerospace competitiveness

Matai 10 – PhD in Engineering, won The Queen’s Award for Enterprise in the category of Innovation for Bespoke Security Architecture in 2003, authority on countering complex global threats; strategic risk management & visualisation; contingency planning; Information Operations (IO); electronic defence; biometric authentication; secure payment systems and Open Source hardened kernel solutions

DK, 6-13-2010, “Japan Takes Lead in Wireless Power? 21stC Global Energy Supply,” Asymmetric Threats Contingency Alliance, http://www.mi2g.com/cgi/mi2g/frameset.php?pageid=http%3A//www.mi2g.com/cgi/mi2g/press/130610.php

In the footsteps of Nikola Tesla, Japan intends to send its first solar-panel-equipped satellite into space that could wirelessly beam Gigawatt-strong streams of power down to earth, each enough to power nearly 300,000 homes eco-efficiently. A Gigawatt is what a mid-size nuclear power station produces. Putting solar panels in space bypasses many of the difficulties of installing them on Earth. In orbit, there are no cloudy days, very few zoning laws, and the cold ambient temperature is ideal for causing the least amount of weathering and degradation in performance. The Ministry of Economy, Trade and Industry (METI) and the Japan Aerospace Exploration Agency are leading the project. They plan to launch a small satellite fitted with solar panels in the coming few years, and test beaming the electricity from space through the ionosphere, the outermost layer of the earth's atmosphere. The full-fledged satellites will have a surface area of four square kilometres each, and transmit power via microwaves to a base station on Earth. Japan's eventual plan is to have a Space Solar Power System (SSPS), in which arrays of photovoltaic dishes several square kilometres in size would hover in geostationary orbit outside the Earth's atmosphere. The entire system is likely to be fully operational in stages in the coming two decades. The USD 21 billion Wireless Power Transmission (WPT) project has received major backing from Mitsubishi and designer IHI, in addition to research teams from 14 other countries. Space Solar Power System (SSPS) 21st Century Innovations Innovations enabled by Wireless Power Transmission (WPT), originally pioneered by Tesla, are likely to exert **profound influence** on global business and national competitiveness. The key issue with wireless power solutions is not whether humanity can deploy them; but whether we can deploy them safely and efficiently. It turns out the human body is not affected by magnetic fields; it is affected by electric fields. So what needs to be done in Wireless Power Transmission (WPT) is to transmit the energy using the magnetic field whilst minimising the electric field. Commercial opportunities from WPT include: 1. Long Range Cars: Roadway powered electric vehicles may charge electric batteries via WPT from microwave generators embedded in the roadway while a vehicle is travelling at highway speed. This eliminates stops to exchange or recharge batteries greatly extending travel range. Japan proposed wireless charging of electric motor vehicles by Microwave Power Transmission (MPT) in 2004. 2. Long Endurance Aircraft: High-altitude aircraft may be maintained at a desired location for weeks or months for communications and surveillance instead of satellites. This greatly reduces costs. The world's first Microwave Power Transmission (MPT) in the ionosphere called the MINIX -- Microwave Ionosphere Non-linear Interaction eXperiment -- was demonstrated in Japan in 1983. The world's first fuel free airplane powered by microwave energy broadcast from the ground was tested in Canada in 1987. This system is called SHARP or Stationary High-Altitude Relay Platform. In 2003, Dryden Flight Research Centre of NASA demonstrated a laser powered remote control airplane. 3. Power Relay Satellites can access remote energy sources by uncoupling primary electricity generation from terrestrial transmission lines. Power is transmitted from distant sites to geosynchronous orbits and then reflected by Power Relay Satellites to a receiver on Earth in a desired location. 4. Solar Power Satellites (SPS) in low-Earth or geosynchronous orbits or on the Moon can be utilised to supply terrestrial power demands on a global scale. 5. Intel has demonstrated the wireless powering of a 60 watt light bulb with 75% efficiency in 2008 using their Wireless Energy Resonant Link. Potential applications include the rigging of airports, offices and other buildings to supply wireless power to laptops, mobile telephones and other electronic devices added to them. Initially WPT eliminates chargers and eventually it eliminates batteries altogether. Eco-efficiency High level response to our briefing, "Beyond Oil: Beginning of a New Era?" concludes that post the Gulf of Mexico oil gusher in 2010 and mounting public pressure, a massive restructuring of the energy industry sector may be in the offing, as profound changes on a **global scale** are set in motion. These changes could be a complex combination of: 1. Strict conservation measures and environmental regulations being enacted across the globe; 2. Accelerated global industrialisation hitting natural resource limits; and 3. Restricted and highly-efficient consumption of fossil fuels because of the unprecedented manifestation of severe risk to Earth's ecology. Humanity is in need of a new power source and more efficient distribution and consumption of power. Fossil fuels are dirty, dangerous to extract and transport, and will eventually run out. Nuclear power is cleaner in production but has its own waste issues and a catastrophic failure could present a near doomsday scenario as well as spent fuel being used as a weapon. Ground based solar power can be too small scale and inefficient, but Solar Power Satellites (SPS) are ground-breaking. This is the big idea that makes large-scale unencumbered solar power work because one isn't covering the countryside with panels, or receiving intermittent power as weather changes. With WPT, 'transporting' the remote solar power becomes much more efficient making it usable virtually everywhere on Earth. Wireless Power Transmission (WPT) Per our original briefing, "Wireless Power: Has The Time Come?" the vision of achieving WPT on a global scale was proposed over a century ago when Nikola Tesla, the inventor of Alternating Current (AC) power generation, first started experiments with WPT. This culminated with the construction of the Wardenclyffe tower for WPT on Long Island, New York, at the start of the 20th century. Tesla's objective was to develop the technology for transmitting electricity to anywhere in the world without wires. He filed several patents describing wireless power transmitters and receivers. He was awarded the patent for wireless radio in 1940. Two basic alternatives are available for WPT: radio waves (microwaves) and light waves (lasers). Radio waves are beamed in a cloud-penetrating radio-frequency band reserved for Industrial, Scientific and Medical (ISM) applications. Light waves are beamed in a wavelength which can be generated efficiently and easily transmitted through the atmosphere in the optical or infra-red "window". Reducing Losses via WPT One of the major issues in global power systems is the loss which occurs during the transmission and distribution of electrical power. As the demand increases day by day, the power generation increases and the power loss is also increased. The percentage of loss of power during transmission and distribution is approximated at 25% or much higher. The main reason for power loss during transmission and distribution is the resistance of wires used for the grid. The efficiency of power transmission can be improved to a certain extent by using high strength composite over head conductors and underground cables that use high temperature super conductors. But the transmission is still inefficient. WPT can significantly reduce the terrestrial losses by providing a highly efficient quantum jump -- near 10% pickup in efficiency -- for alternative energy power transfer and distribution. That is an important incremental step because it also allows for the extension of electricity to transportation. One could simply argue that the less fuel that is used in transportation the safer, greener, and more efficient we get. This is a positive by itself, because of the incremental nature of the gains. USA: NASA and DoE In the US, the National Aeronautics and Space Administration (NASA) and the Department of Energy (DoE) have spent significant sums over three decades in not so coherent -- somewhat sporadic -- efforts to study solar generation in space, according to a 2007 report by the US National Security Space Office. The deployment of WPT was not effectively pursued until the 1960s when the US Air Force funded the development of a microwave-powered helicopter platform. A successful demonstration of a microwave beam-riding helicopter was performed in 1965. This demonstration proved that a WPT system could be constructed and that effective microwave generators and receivers could be developed for efficient conversion of microwaves into DC electricity. In 1975, a successful demonstration of microwave wireless power transmissions was performed at the NASA Deep Space Antenna facility at Goldstone, California. In this demonstration of point-to-point WPT, 30 kW of microwaves were beamed over a distance of one mile to a receiving antenna. Microwaves were converted directly into DC at an average efficiency of 82%, confounding critics who claimed that such high conversion efficiencies could not be achieved. By 1976 engineering, environmental, and economic analyses of several Solar Power Satellite (SPS) concepts had been performed by NASA. WPT systems have not been considered seriously for civilian purposes by US government agencies since 1980. However, the mood has been changing in favour of WPT in recent years. However, nascent efforts in regard to Space Solar Power (SSP) and WPT by NASA are likely to be trimmed by the recent focus on budget deficit reductions. Conclusion The demand for power on Earth is growing exponentially, and associated environmental consequences are becoming significant. Global electric power production is about a USD 1 trillion per year market currently, and represents the **largest market on Earth**. In this new century, Space Solar Power (SSP) may provide a clean, safe energy source, alleviating some of the problems we would otherwise expect from increasing nuclear and fossil fuel use. SSP combined with Wireless Power Transmission (WPT), offers the far-term potential to solve major energy problems on Earth. WPT is an enabling technology for utilising renewable and inexhaustible energy sources on Earth and in space to meet projected electrical energy demands in the 21st century on a global scale. With few energy resources of its own and heavily reliant on oil imports, Japan has long been a leader in solar and other renewable energies. The current opportunities that Japan's nascent Wireless Power Transmission (WPT) industry is providing will be the basis not only for energy independence domestically from imported energy sources, but as a supplier of "clean" energy, Japan is likely to gain significant political influence and leverage globally. Penetration of this market by gradually substituting WPT to access renewable and inexhaustible energy sources anywhere on Earth and in space is an opportunity that Japan has clearly recognised. The implications of successful developments of WPT systems by the Japanese are profound enough to merit a deliberate US or European competitive decision either to pursue further coherent development of WPT or to abandon pursuit of WPT markets to other countries. The consequences of abandoning WPT may include adverse impact on Western industrial competitiveness in the 21st century and beyond. It is now obvious that: 1. Nikola Tesla and his early 20th century unique work in regard to Wireless Power generation and transmission was extremely far sighted and accurate; 2. The Japanese government and multi-nationals are committing tens of billions of dollars to the deployment of SSP and WPT because this is a lucrative area; and 3. Given the fallout from the Gulf of Mexico oil catastrophe, there is going to be little choice left other than to move towards SSP and WPT type solutions. The Western nations including the US and Europe are still in a position to lead a Space Solar Power (SSP) and Wireless Power Transmission (WPT) effort **but not for long**. The question is not whether we harness power from Space; but rather who will get there first to garner first mover advantage with **significant impact on global economic competitiveness**. Now is the time to plan for the WPT future that can be discerned in broad outlines only. The inability to see the future except as a continuation of the present and not to plan for asymmetric threats and opportunities will **prevent critical technological evolution and progress**. Maximising the opportunities to participate in the development and applications of SSP and WPT systems would provide not only an outlet for the considerable experience and talents residing in the global aerospace and manufacturing industries, but ensure **that these industries remain competitive** in the markets for environmentally compatible energy sources where carbon based fuels are no longer the essential element for electrical power generation. The evolution of the human species into the cosmos, including harnessing the moon and immediate outer space, appears to provide a viable space solar and wireless power solution. There is no turning back from this final frontier in the 21st century and beyond!

### Mass investment into *groundbreaking* space development reverses this trend – only *federal government certainty* ensures private sector investment and long-term sustainability of the aerospace sector

-US losing space leadership now

-only a federal investment solves the innovation vacuum – invigorates science education and a strong aersospace workforce

-counterplans that rely on previous goals won’t cut it – a groundbreaking new science and tech focus is key

Mankins 9 – Former NASA Scientist, managed numerous advanced space technology programs during his 25 years at NASA Headquarters and the Jet Propulsion Laboratory, and is widely known as an expert in space solar power

John, “To boldly go: the urgent need for a revitalized investment in space technology,” 5-18-2009, http://www.thespacereview.com/article/1377/1

Unfortunately, the US investment in advanced research and technology for space exploration and development has been reduced to historically low levels, and concurrently has been focused more narrowly than ever before on immediate system designs and development projects. In many respects, the current budget is little more than an “advanced development” program with minimal opportunity for innovation and essentially no possibility that an invention arising from civil space research and technology programs could influence system design decisions, inform budget estimates or inspire new, more ambitious space program goals. The challenge today Space has never been more important to our national security than it is today. The opportunities for truly profound scientific discoveries through space exploration have never been greater. And the pace of international development of new capabilities for space operations has never been faster. Federal budgets for advanced research and technology to enable future space exploration and development have been reduced in scope and focused on near-term system developments to the point that **US preeminence in space** activities **is in question**. NASA’s advanced space research and technology budget was over $2 billion in fiscal year (FY) 2005, with a focus on objectives five to ten years in the future and with the purpose of informing program and design decisions, while retiring both technical and budget risks of those future programs. The President’s FY 2007 budget for NASA exploration technology declined to less than $700 million, and of that only a small fraction (perhaps less than $200 million) still addressed longer-term objectives. The corresponding budgets in 2008 and 2009 were further reduced. Little to none of the remaining investment deals with enabling fundamentally new goals or objectives, or dramatically reducing expected costs. With these funding levels and program goals, it is unlikely that the US will maintain leadership in space exploration beyond the current generation of projects—all of which are founded on the “seed corn” harvested from past investments in innovative new space capabilities. Further, **declining support for space research and technology** is creating an innovation vacuum in the US as small **business opportunities evaporate**, and **funding for universities and students vanishes**. This trend jeopardizes America’s long-term leadership in space exploration and development, and damages our ability to achieve important national security goals. History Since the conclusion of the Apollo program in the early 1970s, the US space program has experienced varying levels of support from national leaders in the White House and the US Congress. Moreover, during most of that time human exploration beyond low Earth orbit has been “off the agenda”, with the exception of the short-lived Space Exploration Initiative (SEI) of 1989–1993. During the same period, US robotic exploration has had a number of tremendous successes, primarily involving the outer planets (e.g., Voyager spacecraft, Galileo, and more recently, Cassini), but also the inner solar system (e.g., Viking on Mars, Magellan at Venus), and the recent series of Mars missions (e.g., Pathfinder/Sojourner, Mars Observer, Spirit and Opportunity). However, these programs have tended to reflect one-of-a-kind successes with a minimal number of spacecraft and missions using common systems or technologies, resulting in continuing very high costs. Various attempts to create a foundation of common technologies and modular spacecraft have failed. Similarly, attempts to bridge the gap between robotic mission systems technologies and human space flight technologies (e.g., “Platform Z” from the early Space Station Freedom program) have failed. The most notable successes in this vein arose from the in-space assembly and spacecraft servicing capabilities of the Space Shuttle, first in the early 1980s with the Solar Max servicing mission, then with the series of hugely successful Hubble Space Telescope servicing missions, and finally with the assembly of the International Space Station. However, these achievements were far more the exception than the rule. For the most part human and robotic exploration systems and technologies became increasingly isolated beginning in the 1970s. More recently Following the Columbia tragedy in 2003, the direction of the US space program was again the subject of intense discussion (led by the White House) and including various agencies and organizations. The result, announced in January 2004, was the “Vision for Space Exploration” (VSE). The VSE as formulated originally was much more than a new justification for human space flight. Rather, the Vision addressed the full range of human and robotic exploration, as well as a revitalization of advanced space research and technology with far-reaching implications. The original VSE strategy placed strong emphasis on studies, research, and technology developments that would in time inform decisions regarding architectures and systems for (1) a Space Shuttle replacement; (2) annual robotic technology missions to the Moon; (3) a human return to the Moon to establish a permanent presence; (4) new space observatories to explore the universe beyond our solar system; (5) a campaign of robotic missions to Mars and beyond; and more. With current funding levels and program goals, it is unlikely that the US will maintain leadership in space exploration beyond the current generation of projects—all of which are founded on the “seed corn” harvested from past investments in innovative new space capabilities. However, in 2005 NASA shifted to a dramatically different approach to exploration and related technology developments with the results of the Exploration Systems Architecture Study. ESAS results placed exclusive emphasis on a US human lunar return and in an attempt to accelerate the first operational capability for the “crew exploration vehicle”—a capsule-based Space Shuttle replacement. To achieve this focus, numerous strategic changes were necessary. References to other aspects of space science and exploration were dropped, as was integrated planning of human and robotic exploration missions. For example, the initially planned annual campaign of robotic technology missions to the Moon was reduced to a single orbiter and one lunar lander mission, and these retained little or no role in guiding design decisions for human lunar systems. Also, to avoid technology-related risks, a range of lifecycle cost-related architectural options were eliminated from consideration, including in-space assembly of lunar transportation systems, in-space fueling and servicing, reusable lunar transportation systems, and others. The result was a family of systems for low Earth orbit access and a return to the Moon that involved a re-sized, Apollo-like architectural approach, with a heavy-lift launch vehicle and expendable transportation system elements. Significant shifts in agency budgets followed these new strategic directions, including drastic reductions in advanced space research and technology development, and a redefinition of remaining investments as “technology development”, focused on already-made design decisions. This shift in strategy was epitomized by NASA’s elimination of the NASA Institute of Advanced Concepts (NIAC) on the grounds of budget constraints, despite that fact that NIAC represented less than one third of one percent of the agency’s annual budget. The real point was that NIAC no longer had a legitimate role given NASA’s new approach to innovation: low engineering risk designs, and modest technology developments focused on those designs. Unfortunately, the elimination of design-to-cost and investments in longer-term innovation have come with a price. By recent estimates, the transportation-related cost of a single human mission to the Moon using the present, low-technology design solution will exceed $5 billion; transportation for two crewed lunar missions per year would require approximately 60% of NASA’s annual budget. Moreover, in-house agency subject matter expertise has been severely affected, as has the Agency’s contribution to US space technology leadership. Overall, the ambitious goals that were articulated by the White House in 2004 have been pushed into the indefinite future. A permanent human outpost of the Moon, development of lunar resources, deployment of large space observatories, and ambitious missions to the outer planets: all of these have been pushed out into the future by 20 years or more. Moreover, it is difficult to envision how such goals could ever be achieved using current systems concepts and concomitant prohibitively high costs. Only new systems concepts, enabled by focused space research and technology developments, can change this assessment. At the same time, real progress continues to be made by the international space community, grounded in steady investments in new technologies and systems—and resulting in regular accomplishments in space systems. The international flotilla of robotic space missions to the Moon illustrates this point: the US contribution of a single orbiter and a future lander are largely indistinguishable from the missions of other countries. Without an adequate strategy for, and more robust investment in, advanced space research and technology, long-term US preeminence in space exploration and development is doubtful. The Office of Naval Research (ONR) of the US Department of Defense (DOD) provides a useful example for how long-term but focused government research and technology advancement may be pursued. In particular, the ONR uses four complementary program strategies: a foundation of in-house subject matter expertise, sustained basic research and technology investments, development and demonstration of prototypes, and a focus on future capabilities. The concept of “Future Naval Capabilities” (FNCs) is used by the ONR to focus advanced research and technology (R&T) efforts around novel systems and concepts of operations. FNCs allow a range of R&T investments to be coordinated around specific new capabilities—even though the details of those systems designs have not yet been finalized, nor development programs approved. Also, the ONR uses the concept of “Innovative Naval Prototypes” (INPs) to orchestrate a range of ongoing R&T and draw the results of those efforts into nearer-term demonstrations of working prototypes and test-beds. INPs are characterized by ambitious technical objectives, and their potential to truly transform future naval operations. In addition, the ONR has preserved for over 60 years a commitment to long lead, discipline-oriented research and technology development. These investments have been responsible for advances in areas as diverse as materials, electronics, communications, power, and others—but all leading toward naval preeminence. And finally, DOD investments have maintained a foundation of in-house subject matter expertise at the Naval Research Laboratory (NRL) and other installations. Over the years, these in-house experts have enabled more effective technology investment decisions and, working with civilian and uniformed leaders better system acquisition decisions. Novel technologies and systems concepts must be matured and validated before decisions are made regarding the detailed designs of future space systems. There are a variety of business models that might be considered for space research and technology development. However, the strategies used by the ONR for its investments seem especially appropriate to the long-term character of the challenge of space exploration and development. For civil space exploration and development, these would be: (1) maintenance of in-house NASA subject matter expertise in relevant technologies; (2) sustained, discipline-oriented investment in basic research and technology at NASA centers, universities, and small businesses; (3) development and demonstration of transformational systems prototypes in partnerships involving NASA, major industry and others; and (4) a sustained focus on future space capabilities. And the results of these investments must be harvested before designs are finalized and system acquisition programs started. Assessment It is hardly consistent with the aspirations of Americans to “go where everyone has been before…” However, it is fantasy to suppose that the civil space program can affordably accomplish ambitious goals and objectives in space using systems concepts and technologies of the last century. Novel technologies and systems concepts must be matured and validated before decisions are made regarding the detailed designs of future space systems. In fact, numerous reports over a period of decades have established the criticality of a robust and focused investment in advanced research and technology, including the findings of several National Commissions, committees of the National Academy of Sciences, and others. ***Stable, robust*, *long-term* *federal investments*** in advanced research and technology for future civil space capabilities—funded at a level sufficient to assure US preeminence in space science, exploration, and utilization—**are critical** if we are to meet the challenges of this century: achieving ambitious goals in science and exploration, delivering on the promise of space to contribute to a strong national economy, maintaining a skilled aerospace workforce, and providing the **foundations for future national security**. It is time for the Congress and the White House—recognizing the challenges facing this nation’s space sector—to articulate and implement a strategy to revitalize advanced space research and technology and to make a sustained commitment to the implementation of that strategy. The recently chartered national study on the future of human space exploration, chaired by Norm Augustine, should take up this task. What should be done? The following actions are needed now: The federal government should revitalize its investment to invent and develop innovative new technologies for space science, exploration, and development, consistent with assuring US preeminence in space activities and industry’s ability to adopt these innovations for application in future space missions and markets. A balanced distribution should be created in the allocation of revitalized advanced space research and technology funding among more basic research efforts, technology maturation, and demonstrations of new technologies. These investments should be guided by the goal of creating ambitious new “future space capabilities”—well-enough defined to inform technology investments, but flexible enough to allow the results of those investments to influence designs, reduce costs, and enable new and more ambitious science goals. In establishing these investments, NASA must seek and embrace inputs from outside the agency (including other agencies, industry, academia) to develop, review, and recommend NASA advanced space research and technology plans, programs, and strategies. NASA in-house space research and technology (performed by engineers and technical specialists) should be restored, in balance with increased external research (by industry and academia). Funding for university research should also be targeted toward producing graduates with advanced degrees to support the follow-on work that will be undertaken by industry. We need to reconsider what makes an ambitious space program worth a substantial investment of public dollars—and consider again the historical and future importance of advancing space technology and developing truly new and valuable space capabilities for the public, the nation, and the world. To achieve the purposes for which it was created, NASA must maintain the excellence of its workforce and their expertise in a wide array of cutting-edge new technologies. As they enter the workforce, it will be **impossible to attract** the “best and the brightest” to federal service without a foundation of cutting-edge research and technology program opportunities. Moreover, a healthy NASA workforce, armed with appropriate skills and secure in its future, will provide better oversight for technical system procurement and program management. This competence will result in better performing systems, better ability to meet schedule, more productive interactions with other stakeholders in the aerospace enterprise, and more efficient use of taxpayer dollars. Although NASA must accommodate changing priorities and budgets, it must also ensure that it does not lose the important skills and knowledge currently possessed by its workers. NASA also must continue to ensure that the NASA workforce gains the new competencies needed in the aerospace industry of the future. In order accelerate the transition of novel technologies into transformational future space capabilities **NASA must invest in demonstrations of innovative space prototypes** on the ground and in space. Innovative space prototypes should be implemented in coordination with the DoD, academia, and industry; and wherever possible with co-funding with the private sector in order to speed the application of these new capabilities in creating new space industries. To implement these recommendations effectively, focused and timely near term action is essential: The National Academy of Sciences (National Research Council) should be chartered to conduct an independent, visionary study to identify 6–12 transformational “future space capabilities” that would—if developed—enable a wide range of new, ambitious, and affordable space exploration and development. These future space capabilities would in turn drive planning for government and industry research and technology investments. The Administration should develop—in consultation with the US Congress, and using NASA as its executive agent—a strategic research and technology development roadmap that establishes a baseline for achieving these goals, including objectives, schedules, milestones and budgets. This roadmap should be used to provide the basis for future US investments in advanced space research and technology development and demonstrations. The US space program needs more than a national discussion of what human exploration should do next: International Space Station research versus lunar outposts versus asteroid sorties versus human Mars missions, and so on. These are important questions. Even more, however, we need to set in place basic policies that can endure from one administration to the next. We need to reconsider what makes an ambitious space program worth a substantial investment of public dollars—and consider again the historical and future importance of advancing space technology and developing truly new and valuable space capabilities for the public, the nation, and the world.

### Only a federal investment into SSP invigorates US aerospace leadership

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:  The SBSP Study Group found that SBSP offers a path to address the concerns over US intellectual competitiveness in math and the physical sciences expressed by the Rising Above the Gathering Storm report by providing a true “Manhattan or Apollo project for energy.” In absolute scale and implications, it is likely that SBSP would ultimately **exceed both the Manhattan and Apollo projects** which established significant workforces and helped the US maintain its technical and competitive lead. The committee expressed it was “deeply concerned that the scientific and technological building blocks critical to our economic leadership are eroding at a time when many other nations are gathering strength.” SBSP would require a substantial technical workforce of high‐paying jobs. It would require expanded technical education opportunities, and directly support the underlying aims of the American Competitiveness Initiative. FINDING: The SBSP Study Group found that SBSP directly addresses the concerns of the Presidential Aerospace Commission which called on the US to become a true spacefaring civilization and to pay closer attention to our aerospace technical and industrial base, our “national jewel” which has enhanced our security, wealth, travel, and lifestyle. An SBSP program as outlined in this report is remarkably consonant with the findings of this commission, which stated: The United States must maintain its preeminence in aerospace research and innovation to be the global aerospace leader in the 21st century. This can only be achieved through proactive government policies and sustained public investments in long‐term research and RDT&E infrastructure that will result in new breakthrough aerospace capabilities. Over the last several decades, the U.S. aerospace sector has been living off the research investments made primarily for defense during the Cold War…Government policies and investments in long‐term research have not kept pace with the changing world. Our nation does not have bold national aerospace technology goals to focus and sustain federal research and related infrastructure investments. The nation needs to capitalize on these opportunities, and **the federal government needs to lead the effort.** Specifically, it needs to invest in long‐term enabling research and related RDT&E infrastructure, establish national aerospace technology demonstration goals, and create an environment that fosters innovation and provide the incentives necessary to encourage risk taking and rapid introduction of new products and services. The Aerospace Commission recognized that Global U.S. aerospace leadership **can only be achieved** through investments in our future, including our industrial base, workforce, long term research and national infrastructure, and that government must commit to increased and sustained investment and must facilitate private investment in our national aerospace sector. The Commission concluded that the nation will have to be a space‐faring nation in order to be the global leader in the 21st century—that our freedom, mobility, and quality of life will depend on it, and therefore, recommended that the United States boldly pioneer new frontiers in aerospace technology, commerce and exploration. They explicitly recommended hat the United States create a space imperative and that NASA and DoD need to make the investments necessary for developing and supporting future launch capabilities to revitalize U.S. space launch infrastructure, as well as provide Incentives to Commercial Space. The report called on government and the investment community must become more sensitive to commercial opportunities and problems in space. Recognizing the new realities of a highly dynamic, competitive and global marketplace, the report noted that the **federal government is dysfunctional** when addressing 21st century issues from a long term, national and global perspective. It suggested an increase in public funding for long term research and supporting infrastructure and an acceleration of transition of government research to the aerospace sector, recognizing that government must assist industry by providing insight into its long‐term research programs, and industry needs to provide to government on its research priorities. It urged the federal government must remove unnecessary barriers to international sales of defense products, and implement other initiatives that strengthen transnational partnerships to enhance national security, noting that U.S. national security and procurement policies represent some of the most burdensome restrictions affecting U.S. industry competitiveness. Private‐public partnerships were also to be encouraged. It also noted that without constant vigilance and investment, vital capabilities in our defense industrial base will be lost, and so recommended a fenced amount of research and development budget, and significantly increase in the investment in basic aerospace research to increase opportunities to gain experience in the workforce by enabling breakthrough aerospace capabilities through continuous development of new experimental systems with or without a requirement for production. Such experimentation was deemed to be essential to sustain the critical skills to conceive, develop, manufacture and maintain advanced systems and potentially provide expanded capability to the warfighter. A top priority was increased investment in basic aerospace research which fosters an efficient, secure, and safe aerospace transportation system, and suggested the establishment of **national technology demonstration goals**, which included reducing the cost and time to space by 50%. It concluded that, “America must exploit and explore space to assure national and planetary security, economic benefit and scientific discovery. At the same time, the United States must overcome the obstacles that jeopardize its ability to sustain leadership in space.” An SBSP program would be **a powerful expression** of this imperative.

### Economic benefits happen *before any component* is ever in space

SEC 8

Space Enterprise Council, 2008, NSS, http://www.nss.org/settlement/ssp/library/2008-SECSpaceBasedSolarPowerWhitePaper.pdf

SBSP is unusual among renewable energy options because it might satisfy all four of the following criteria critical to investment decisions: environmental cleanliness, sustainability of supply, flexibility of location, and capacity to generate continuous rather than intermittent power. The cost of SBSP-generated electricity would initially be greater than that provided by fossil fuel or nuclear power but could be comparable to other alternative energy sources, particularly for baseload power. In addition, SBSP might offer an attractive approach, not only for satisfying today's needs but also for meeting tomorrow’s much greater requirements. We cannot accurately predict environmental and other consequences of harvesting energy from natural Earthbound sources (e.g., wind, ocean current, geothermal, biofuels), when these methods are scaled up to considerably higher levels. By providing an additional source of renewable energy, SBSP might help avoid potentially negative consequences if limits to the costeffective expansion of other renewable sources become evident. Beyond enhancement of energy production per se, SBSP might help create new economic opportunities through resultant technology advances in space launch, space utilization, and technological spin-offs applicable to a host of materials and processes. For example, SBSP research might lead to improvements in the efficiency of solar cells that power communications satellites, as well as power management systems for terrestrial solar power systems. Also, to the extent that SBSP is integrated into terrestrial solar power production, development of SBSP ground infrastructure might generate revenue **even before deployment of systems in space**. In this and related applications, SBSP could emerge as an enhancement for, rather than a competitor with, terrestrial solar power generation.

### Four impacts – first hegemony

### A collapsing aerospace sector takes down *key sectors* of US hegemony

Walker et al 2 – Chairman of the USAI

Robert Walker, et cal, Chair of the Commission on the Future of the United States Aerospace Industry Commissioners, 2002, “Final Report of the Commission on the Future of the United States Aerospace Industry Commissioners,” <http://www.trade.gov/td/aerospace/aerospacecommission/AeroCommissionFinalReport.pdf>

Defending our nation against its enemies is the first and fundamental commitment of the federal govern-ment.2 This translates into two broad missions—Defend America and Project Power—when and where needed. In order to defend America and project power, the nation needs the ability to move manpower, materiel, intelligence information and precision weaponry swiftly to any point around the globe, when needed. This has been, and will continue to be, a mainstay of our national security strategy. The events of September 11, 2001 dramatically demonstrated the extent of our national reliance on aerospace capabilities and related military contribu-tions to homeland security. Combat air patrols swept the skies; satellites supported real-time communica-tions for emergency responders, imagery for recov- ery, and intelligence on terrorist activities; and the security and protection of key government officials was enabled by timely air transport. As recent events in Afghanistan and Kosovo show, the power generated by our nation’s aerospace capa-bilities is an—and perhaps **the—essential ingredient** in **force projection and expeditionary operations**. In both places, at the outset of the crisis, satellites and reconnaissance aircraft, some unmanned, provided critical strategic and tactical intelligence to our national leadership. Space-borne intelligence, com-mand, control and communications assets permitted the rapid targeting of key enemy positions and facil-ities. Airlifters and tankers brought personnel, materiel, and aircraft to critical locations. And aerial bombardment, with precision weapons and cruise missiles, often aided by the Global Positioning System (GPS) and the Predator unmanned vehicle, destroyed enemy forces. Aircraft carriers and their aircraft also played key roles in both conflicts. Today’s military aerospace capabilities are indeed robust, but at significant risk. They rely on platforms and an industrial base—measured in both human capital and physical facilities—that are aging and increasingly inadequate. Consider just a few of the issues: • Much of our capability to defend America and project power depends on satellites. Assured reli-able access to space is a critical enabler of this capa-bility. As recently as 1998, the key to near- and mid-term space access was the Evolved Expendable Launch Vehicle (EELV), a development project of Boeing, Lockheed Martin and the U. S. Air Force. EELV drew primarily on commercial demand to close the business case for two new launchers, with the U.S. government essentially buying launches at the margin. In this model, each company partner made significant investments of corporate funds in vehicle development and infrastructure, reducing the overall need for government investment. Today, however, worldwide demand for commer-cial satellite launch has dropped essentially to nothing—and is not expected to rise for a decade or more—while the number of available launch platforms worldwide has proliferated. Today, therefore, the business case for EELV simply does not close, and reliance on the economics of a com-mercially-driven market is unsustainable. A new strategy for assured access to space must be found. • The U.S. needs unrestricted access to space for civil, commercial, and military applications. Our satellite systems will become increasingly impor- tant to military operations as today’s information revolution, the so-called “revolution in military affairs,” continues, while at the same time satellites will become increasingly vulnerable to attack as the century proceeds. To preserve critical satellite net-works, the nation will almost certainly need the capability to launch replacement satellites quickly after an attack. One of the key enablers for “launch on demand” is reusable space launch, and yet within the last year all work has been stopped on the X-33 and X-34 reusable launch programs • The challenge for the defense industrial base is to have the capability to build the base force struc-ture, support contingency-related surges, provide production capacity that can increase faster than any new emerging global threat can build up its capacity, and provide an “appropriate” return to shareholders. But the motivation of government and industry are different. This is a prime detrac-tion for wanting to form government-industry partnerships. Industry prioritizes investments toward near-term, high-return, and high-dollar programs that make for a sound business case for them. Government, on the other hand, wants to prioritize investment to ensure a continuing capa-bility to meet any new threat to the nation. This need is cyclical and difficult for businesses to sus-tain during periods of government inactiv-ity. Based on the cyclic nature of demand, the increasing cost/complexity of new systems, and the slow pace of defense modernization, aerospace companies are losing market advantages and the sector is contracting. Twenty-two years ago, today’s “Big 5” in aerospace were 75 separate companies, as depicted by the historical chart of industry con-solidation shown in Chapter 7. • Tactical combat aircraft have been a key compo-nent of America’s air forces. Today, three tactical aircraft programs continue: the F/A-18E/F (in production), the F/A-22 (in a late stage of test and evaluation), and the F-35 Joint Strike Fighter (just moving into system design and development). Because of the recentness of these programs, there are robust design teams in existence. But all of the initial design work on all three programs will be completed by 2008. If the nation were to con- clude, as it very well may, that a new manned tac- tical aircraft needs to be fielded in the middle of this century, where will we find the experienced design teams required to design and build it, if the design process is in fact gapped for 20 years or more? • More than half of the aerospace workforce is over the age of 404, and the average age of aerospace defense workers is over 50.5Inside the Department of Defense (DoD), a large percent of all scientists and engineers will be retirement eligible by 2005. Given these demographics, there will be an exodus of “corporate knowledge” in the next decade that will be difficult and costly to rebuild once it is lost. There will be a critical need for new engineers, but little new work to mature their practical skill over the next several decades. Further, enrollment in aerospace engineering programs has dropped by 47 percent in the past nine years6, and the interest and national skills in mathematics and science are down. Defense spending on cutting-edge work is at best stable, and commercial aircraft programs are struggling and laying workers off. As the DoD’s recent Space Research and Development (R&D) Industrial Base Study7 concluded, “[s]ustaining a talented workforce of sufficient size and experience remains a long-term issue and is likely to get worse.” In short, the nation needs a plan to attract, train and maintain a skilled, world-class aerospace workforce, but none currently exists. • The current U.S. research, development, test and evaluation (RDT&E) infrastructure has a legacy dating back to either World War II or the expan- sion during the Space Age in the 1960s. It is now suffering significantly from a lack of resources required for modernization. In some cases, our nation’s capabilities have atrophied and we have lost the lead, as with our outdated wind tunnels, where European facilities are now more modern and efficient. In the current climate, there is inad- equate funding to modernize aging government infrastructure or build facilities that would support the development of new transformational capabil- ities, such as wind tunnels needed to design and test new hypersonic vehicles. The aerospace indus-try must have access to appropriate, modern facil- ities to develop, test and evaluate new systems. Throughout this dynamic and challenging environ-ment, one message remains clear: a healthy U.S. aerospace industry is more than a hedge against an uncertain future. It is one of the primary national instruments through which DoD will develop and obtain the superior technologies and capabilities essential to the on-going transformation of the armed forces, thus maintaining **our position as the world’s preeminent military power**.

### The impact is global conflict

Khalilzad 11 – Former US ambassador, former Professor @ Columbia

Zalmay Khalilzad, PhD, United States ambassador to Afghanistan, Iraq, and the United Nations during the presidency of George W. Bush and the director of policy planning at the Defense Department from 1990 to 1992 (2/8/11, National Review, “The Economy and National Security; If we don’t get our economic house in order, we risk a new era of multi-polarity,” <http://www.nationalreview.com/articles/259024/economy-and-national-security-zalmay-khalilzad>

We face this domestic challenge while other major powers are experiencing rapid economic growth. Even though countries such as China, India, and Brazil have profound political, social, demographic, and economic problems, their economies are growing faster than ours, and this could alter the global distribution of power. These trends could in the long term produce a multi-polar world. If U.S. policymakers fail to act and other powers continue to grow, it is not a question of whether but when a new international order will emerge. The closing of the gap between the United States and its rivals could intensify geopolitical competition among major powers, increase incentives for local powers to play major powers against one another, and undercut our will to preclude or respond to international crises because of the higher risk of escalation. The stakes are high. In modern history, the longest period of peace among the great powers has been the era of U.S. leadership. By contrast, multi-polar systems have been unstable, with their competitive dynamics resulting in frequent crises and major wars among the great powers. Failures of multi-polar international systems produced both world wars. American retrenchment could have devastating consequences. Without an American security blanket, regional powers could rearm in an attempt to balance against emerging threats. Under this scenario, there would be a heightened possibility of arms races, miscalculation, or other crises spiraling into all-out conflict**.** Alternatively, in seeking to accommodate the stronger powers, weaker powers may shift their geopolitical posture away from the United States. Either way, hostile states would be emboldened to make aggressive moves in their regions. As rival powers rise, Asia in particular is likely to emerge as a zone of great-power competition. Beijing’s economic rise has enabled a dramatic military buildup focused on acquisitions of naval, cruise, and ballistic missiles, long-range stealth aircraft, and anti-satellite capabilities. China’s strategic modernization is aimed, ultimately, at denying the United States access to the seas around China. Even as cooperative economic ties in the region have grown, China’s expansive territorial claims — and provocative statements and actions following crises in Korea and incidents at sea — have roiled its relations with South Korea, Japan, India, and Southeast Asian states. Still, the United States is the most significant barrier facing Chinese hegemony and aggression.

### Second – deterrence – Independent of hegemony, a weak aerospace industry undercuts deterrence – the impact is great power counterbalancing and conflict

Snead 7 – MS in Aerospace Engineering

Mike Snead, Aerospace engineer, consultant focusing on Near-future space infrastructure development, “How America Can and Why America Must Now Become a True Spacefaring Nation,” Spacefaring America Blog, 6/3, http://spacefaringamerica.net/2007/06/03/6--why-the-next-president-should-start-america-on-the-path-to-becoming-a-true-spacefaring-nation.aspx

Great power status is achieved through competition between nations.  This competition is often based on advancing science and technology and applying these advancements to enabling new operational capabilities.  A great power that succeeds in this competition adds to its power while a great power that does not compete or does so ineffectively or by choice, becomes comparatively less powerful.  Eventually, it loses the great power status and then must align itself with another great power for protection. As the pace of science and technology advancement has increased, so has the potential for the pace of change of great power status.  While the U.S. "invented" powered flight in 1903, a decade later leadership in this area had shifted to Europe.  Within a little more than a decade after the Wright Brothers' first flights, the great powers of Europe were introducing aeronautics into major land warfare through the creation of air forces.  When the U.S. entered the war in 1917, it was forced to rely on French-built aircraft.  Twenty years later, as the European great powers were on the verge of beginning another major European war, the U.S. found itself in a similar situation where its choice to diminish national investment in aeronautics during the 1920's and 1930's—you may recall that this was the era of General Billy Mitchell and his famous efforts to promote military air power—placed U.S. air forces at a significant disadvantage compared to those of Germany and Japan.  This was crucial because military air power was quickly emerging as the "game changer" for conventional warfare.  Land and sea forces increasingly needed capable air forces to survive and generally needed air superiority to prevail. With the great power advantages of becoming spacefaring expected to be comparable to those derived from becoming air-faring in the 1920's and 1930's, a delay by the U.S. in enhancing its great power strengths through expanded national space power may result in a reoccurrence of the **rapid emergence** of new or the rapid growth of **current great powers** to the point that they are capable of effectively challenging the U.S. Many great powers—China, India, and Russia—are already speaking of plans for developing spacefaring capabilities.  Yet, today, the U.S. retains a commanding aerospace technological lead over these nations.  **A strong effort** by the U.S. to become a true spacefaring nation, starting in 2009 with the new presidential administration, may yield a **generation or longer lead in space**, not just through prudent increases in military strength but also through the other areas of great power competition discussed above.  This is an advantage that the next presidential administration should exercise.

### Third – economic leadership – Aerospace competitiveness *drives economic growth* – purely private sector approaches guarantee failure

Hernnstadt 8 – Director of Trade and Globalization @ IAMAW

Owen, director of the Trade and Globalization Department, International Association of Machinists and Aerospace Workers, “Offsets and the lack of a comprehensive U.S. policy,” Economic Policy Institute, http://www.sharedprosperity.org/bp201.html

Aerospace is an especially important industry for a nation's economic and physical security, and perhaps no other country has benefited more from the aerospace industry than the United States.9 The Final Report of the Commission on the Future of the United States Aerospace Industry states that the industry "contributes over 15 percent to our Gross Domestic Product and supports over 15 million high quality American jobs" (Aerospace Industry Commission 2002, 1-2). U.S. aerospace has been identified as a major source of "technical innovation with substantial spillovers to other industrial and commercial sectors" and "high-wage employment, which spreads the benefits of rising productivity **throughout the U.S. economy**.…" The Aerospace Commission also noted the industry's contribution to the nation's "economic growth, quality of life, and scientific achievements…." (Aerospace Industry Commission 2002, 1-2). Despite the importance of aerospace, the deterioration of the industry at home has continued at a dramatic rate. Nearly 500,000 jobs have been lost in the U.S. aerospace industry since 1990 (Aerospace Industry Commission 2002, 8-12; see also AIA 2007), and several hundred thousand more workers have lost their jobs in related industries. Sadly, the fact of these enormous job losses comes as no surprise. More than 10 years ago, in Jobs on the Wing, authors Randy Barber and Robert Scott predicted that "up to 469,000" jobs in the aerospace and related industries "could be eliminated by 2013 because of offset policies and increased foreign competition" (Barber and Scott 1995, 2). In a later study, Scott predicted that by 2013 the industry would suffer a loss of over 25% "of the total jobs in aircraft production in 1995" (Scott 1998). These gloomy predictions are apparently reinforced by U.S. government reports. According to the Department of Labor, the outlook for employment in the U.S. aerospace industry is not rosy: between 2002 and 2012 aerospace employment in the United States will "decrease by 18 percent" (U.S. Department of Labor 2004). The future health of the industry depends in large part on its ability to attract new workers, but the crisis in employment and the prediction that the crisis will deepen does not bode well for attracting new workers. In its final report, the Aerospace Commission summarized this concern: The U.S. aerospace sector, once the employer of choice for the "best and brightest" technically trained workers, now finds it presents a negative image to potential employees. Surveys indicate a feeling of disillusionment about the aerospace industry among its personnel, whether they are production/technical workers, scientists or engineers. The majority of newly dislocated workers say they will not return to aerospace. In a recent survey of nearly 500 U.S. aerospace engineers, managers, production workers, and technical specialists, 80 percent of respondents said they would not recommend aerospace careers to their children. (Aerospace Industries Commission 2002, 8-5) While the Aerospace Commission found that "U.S. policy toward domestic aerospace employment must reaffirm the goal of stabilizing and increasing the number of good and decent jobs in the industry," this policy has yet to be embraced, let alone implemented (Aerospace Industries Commission 2002, 8-12). Far from embracing any sort of effective industrial policy when it comes to aerospace, the U.S. government continues to relegate policy development in this area to private parties, just as it does with offsets in general. The inherent weakness to this approach is obvious—private U.S. companies must compete with foreign companies that have the full support of their governments. If a sale means transferring production and/or technology, **private companies are in a difficult position**. Given that their interests do not always align with the national interest, they can be expected to maximize corporate returns, even though the use of offsets, which **can deeply affect an industry as essential to the nation's economy** and security as aerospace, can be detrimental to U.S. national interests. Should there be any doubt about the seriousness of the competition from foreign entities and governments, one has only to look at the success of companies like EADS. What were once fledgling industries are now U.S. competitors who benefit from a sophisticated approach to offsets that moves jobs and technology their way.10 As succinctly stated by the Aerospace Commission, "…foreign nations clearly recognize the potential benefits from aerospace and are attempting to wrest global leadership away from us" (Aerospace Industries Commission 2002, 1-2). A country that truly understands the importance of adopting a comprehensive aerospace policy based on offsets is China. As reported in the 2005 Report to Congress of the of U.S.-China Economic and Security Review Commission, "…Chinese firms have used their leverage to extract offsets—agreements to transfer some of the aircraft production along with related expertise and technology—as part of the deals"; the report further concludes, "China nurtures its domestic aviation and aerospace industry by exploiting the international competition already in the industry" (U.S.-China Review Commission 2005, 30). Indeed, as summarized in one U.S. government report: China is likely to be the largest customer—and possibly an emerging competitor—of the U.S. aerospace industry in the future. China's aerospace manufacturing base is enormous. U.S. companies (and European companies to a lesser extent) have successfully partnered with Chinese companies that provide components or parts for a number of commercial aerospace programs. However, China also is seeking to become a world-class prime commercial aerospace manufacturing industrial base, both through indigenous development programs and joint ventures with non-Chinese companies. (U.S. Department of Commerce 2005b, xii) In testimony in 2001, the International Association of Machinists and Aerospace Workers (IAM) singled out China for developing an effective industrial policy in an effort to create its own aerospace industry. It noted in its testimony that the U.S. International Trade Commission had already found with respect to China, "…the nation's aviation sector intends to pursue a principal role in commercial aircraft manufacturing."11 During a 1998 visit to China to tour aerospace facilities, IAM participants observed the country's enormous aerospace capacity.12 China's aviation industry "consists of more than 200 enterprises that produce and manufacture products such as aircraft, turboprop engines, aircraft components and subsystems, helicopters, industrial gas turbines, and various electromechanical products" (U.S. Department of Commerce 2005b, 58). China's huge industrial capacity has been noted by other observers as well.13 For example, one research group notes that in China there are six companies devoted to "airframe assembly," eight "engine" companies, 28 entities involved with "components," and 20 "research institutes."14 The two leading aircraft companies in China (China Aviation Industry Corporation I [AVIC I] and Aviation Industry Corporation II [AVIC II]) "and their subsidiaries have about 491,000 employees" (U.S. Department of Commerce 2005b, 5815). How did China develop such a huge capacity for aerospace production? While there are many different and related methods China uses, a significant one is offsets.16 As globalization critic Jeff Faux said in testimony to Congress, "China is one of the most aggressive countries in pursuing offsets agreements and, with its market potential and minimal labor standards, it has substantial leverage in negotiating these agreements" (Faux 2002). And as a business person told the Wall Street Journal, "they're interested in having total access to technology…."17 Of particular concern to the United States is the huge involvement of Boeing in China, an involvement the company acknowledges. According to its Web site: "Boeing procurement from China is significantly greater than other aviation companies" (Boeing 2007). According to company summaries: Since the 1980s, Boeing has purchased more than $1 billion in aviation hardware and services from China. Approximately 4,500 Boeing airplanes with parts and assemblies built by China are flying throughout the world today. Boeing and Boeing supplier partners have active supplier contracts with China's aviation industry valued at well over $2.5 billion (Boeing 2007). A detailed listing illustrating Boeing's extensive procurement activities, production work, and supplier involvement in China appears in the appendix. According to a news report, "Boeing is expanding its relationship with China through plans to double its annual purchases from Chinese companies over the next six years to more than $1 billion per year by 2010" (U.S. Department of Commerce 2005b, 59, citing Business Daily Update, "Boeing Seeks Higher-Level Cooperation With Chinese Suppliers"). Boeing is, of course, just one of many aerospace companies investing in China's aerospace industry; another is Boeing's chief rival, Airbus. As quoted in The Australian ("Airbus Enlists China," June 14, 2004), Airbus Chief Executive Noel Forgeard explained his company's philosophy with respect to China: "Airbus is not only selling aircraft in China but is also committed to the long-term development of China's aviation industry." The Australian also reported that parts of the A380 will be produced in China: European aircraft maker Airbus has subcontracted a state-owned Chinese manufacturer to make parts for its super-jumbo A380 plane, in a deal worth about $170 million. China Aviation Corp. I (AVIC I) will make panels for A380 nose-landing gear….China's Shenyang Aircraft Corp., affiliated with AVIC I, would also be subcontracted to make A330/A340 forward-cargo door projects….Five Chinese companies are now making parts for Airbus. The New York Times reported that Airbus is committed "to buy at least $60 million yearly in parts from China by 2007, rising to $120 million yearly by 2010."18 According to other news reports, China will "build wing boxes for Airbus" in a $500 million deal,19 and Airbus and China have agreed on "a $9 billion order…for 150 narrow-body A320 aircraft, and said they would study the possibility of building a final assembly line for the aircraft in China."20 That study apparently produced positive results; as stated in an Airbus press release ("Joint Venture Contract Signed for the A320 Family Final Assembly Line in Tianjin," June 28, 2007): "The FAL [final assembly line] in Tianjin will be based on the latest state-of-the-art Airbus single-aisle final assembly line in Hamburg, Germany. The aircraft will be assembled and delivered in China to the same standards as those assembled and delivered in Europe." The significance of such a development cannot be overstated: "the memorandum of understanding between China's National Development and Reform Commission and Airbus…meant that China was likely to become only the third country assembling Airbus aircraft, after France and Germany."21 Brazil's aerospace industry is also teaming up with China. "In order to supply its domestic market while continuing to learn how to assemble a modern, complete aircraft to Western standards, two AVIC-II companies teamed with Embraer…in 2002 for co-production of their regional jet (ERJ-145) in Harbin" (Andersen 2008). Eurocopter, a subsidy of EADS, is also involved with China's aerospace industry. "France's Eurocopter and Singapore Technologies Aerospace have signed with Hafei Aviation, a listed arm of one of China's top military contractors, to make helicopters for domestic civil use."22 China's aerospace industry is apparently not content to maintain its current level of success. According to news reports, "China is likely to start developing its own large aircraft rather than rely solely on foreign giants Boeing and Airbus…."23 The country recently announced that it would be entering the large civil aircraft industry in the next 20 years,24 and, according to news reports, much of the success of this effort depends on the transfer of production and technology from other countries, presumably in the form of outsourcing and offsets from U.S. and other aerospace companies. And according to a report in Jane's Defence Weekly, "China is developing a new stealthy fighter jet aircraft and many of the design concepts and components have already been created….This new aircraft is the first Eastern rival to the West's F/A-22 Raptor and F-35 Joint Strike Fighter to be put into development…."25 China's aerospace industry may even be expanding to space. In an article headlined "The Next Space Race: China Heads to the Stars," the New York Times (January 22, 2004) raises the possibility of a space race with China, noting: The Chinese plan to send more astronauts into space next year, to launch a Moon probe within three years, and are aiming to land an unmanned vehicle on the Moon by 2010…. Will the U.S. aerospace industry remain the strongest in the world? As other countries implement industrial policies based on outsourcing and offsets, **the question becomes** more **urgent**. Moves by countries like China to implement industrial policies targeting U.S. leadership in such essential industries as aerospace call for a response by U.S. policy makers. Even if China's aerospace industry remains behind that of the United States, it is poised to contribute to growing global competition. It has the capacity, skilled workforce, and the will to make this a reality. The virtually unregulated world of offsets only exacerbates this situation. While the U.S. government **continues a hands-off approach** to this market-distorting scheme, other countries are giving their companies significant backing based on well-developed industrial policies.

### Economic decline causes global war

Royal 10 – Director of CTR

Jedediah, Director of Cooperative Threat Reduction – U.S. Department of Defense, “Economic Integration, Economic Signaling and the Problem of Economic Crises”, Economics of War and Peace: Economic, Legal and Political Perspectives, Ed. Goldsmith and Brauer, p. 213-215

Less intuitive is how periods of economic decline may increase the likelihood of external conflict. Political science literature has contributed a moderate degree of attention to the impact of economic decline and the security and defence behaviour of interdependent states. Research in this vein has been considered at systemic, dyadic and national levels. Several notable contributions follow. First, on the systemic level, Pollins (2008) advances Modelski and Thompson's (1996) work on leadership cycle theory, finding that rhythms in the global economy are associated with the rise and fall of a pre-eminent power and the often bloody transition from one pre-eminent leader to the next. As such, exogenous shocks such as economic crises could usher in a redistribution of relative power (see also Gilpin. 1981) that leads to uncertainty about power balances, increasing the risk of miscalculation (Feaver, 1995). Alternatively, even a relatively certain redistribution of power could lead to a permissive environment for conflict as a rising power may seek to challenge a declining power (Werner. 1999). Separately, Pollins (1996) also shows that global economic cycles combined with parallel leadership cycles impact the likelihood of conflict among major, medium and small powers, although he suggests that the causes and connections between global economic conditions and security conditions remain unknown. Second, on a dyadic level, Copeland's (1996, 2000) theory of trade expectations suggests that 'future expectation of trade' is a significant variable in understanding economic conditions and security behaviour of states. He argues that interdependent states are likely to gain pacific benefits from trade so long as they have an optimistic view of future trade relations. However, if the expectations of future trade decline, particularly for difficult to replace items such as energy resources, the likelihood for conflict increases, as states will be inclined to use force to gain access to those resources. Crises could potentially be the trigger for decreased trade expectations either on its own or because it triggers protectionist moves by interdependent states.4 Third, others have considered the link between economic decline and external armed conflict at a national level. Blomberg and Hess (2002) find a strong correlation between internal conflict and external conflict, particularly during periods of economic downturn. They write: The linkages between internal and external conflict and prosperity are strong and mutually reinforcing. Economic conflict tends to spawn internal conflict, which in turn returns the favour. Moreover, the presence of a recession tends to amplify the extent to which international and external conflicts self-reinforce each other. (Blomberg & Hess, 2002. p. 89) Economic decline has also been linked with an increase in the likelihood of terrorism (Blomberg, Hess, & Weerapana, 2004), which has the capacity to spill across borders and lead to external tensions. Furthermore, crises generally reduce the popularity of a sitting government. "Diversionary theory" suggests that, when facing unpopularity arising from economic decline, sitting governments have increased incentives to fabricate external military conflicts to create a 'rally around the flag' effect. Wang (1996), DeRouen (1995). and Blomberg, Hess, and Thacker (2006) find supporting evidence showing that economic decline and use of force are at least indirectly correlated. Gelpi (1997), Miller (1999), and Kisangani and Pickering (2009) suggest that the tendency towards diversionary tactics are greater for democratic states than autocratic states, due to the fact that democratic leaders are generally more susceptible to being removed from office due to lack of domestic support. DeRouen (2000) has provided evidence showing that periods of weak economic performance in the United States, and thus weak Presidential popularity, are statistically linked to an increase in the use of force. In summary, recent economic scholarship positively correlates economic integration with an increase in the frequency of economic crises, whereas political science scholarship links economic decline with external conflict at systemic, dyadic and national levels.5 This implied connection between integration, crises and armed conflict has not featured prominently in the economic-security debate and deserves more attention.

### 5 million jobs are at stake

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

Another important and clear terrestrial benefit that would result from the development and deployment of space solar power is that of substantial numbers of new, high-technology jobs in the research, demonstration, manufacturing, deployment and operations of SPS. Of course, such benefits will depend directly on the scope and scale of SPS implementation. Figure 5-6 illustrates one such SPS deployment scenario, as well as the jobs that could result during the first three decades of deployment and operations As illustrated above, in the case of large-scale deployment involving roughly 500 SPS deployed (each generating some 2,000 MW), operated and maintained over a period of some 60 years (including regular repair and maintenance), annual employment on the order of **5,000,000 individuals** might be realized eventually.

### It’s not just high-tech jobs – limiting unemployment creates a social infrastructure that is key to lifting the poorest of the poor

AFL-CIO 1

“An American Economy That Works for All Working Families,” http://www.aflcio.org/aboutus/thisistheaflcio/convention/2001/resolutions/upload/res6.pdf

Low unemployment rates also yield tremendous social benefits by providing a rung on the ladder of economic opportunity to those previously excluded from the labor force. Without the opportunity to earn a living and acquire job skills, it is impossible to participate in the American dream. Falling unemployment throughout the second half of the 1990s provided this opportunity to our most **economically disadvantaged citizens,** and the benefits were enormous for all of us. People everywhere worked when given the chance, welfare roles shrank and economically disadvantaged inner-city areas began to revive. Finally, low unemployment also produces major fiscal benefits. High levels of employment and rising wages increase tax revenues and reduce demand for social services. They also generate higher profits and stock market gains, which add to public revenues through corporate and capital gains taxes. As a result, the nation’s finances are improved, positioning us to invest in **education**, **public infrastructure, health care and retirement security**. In short, low unemployment is the **foundation of rising living standards**, greater productivity, **enhanced opportunities** for the most disadvantaged and sound public finances.

### This solves economic nationalism and protectionism

El-Erian 9 – CEO @ Pimco

Mohamed, chief executive and co-chief investment officer of Pimco, American jobs data are worse than we think, http://www.ft.com/cms/s/0/1e06911c-6719-11de-925f-00144feabdc0.html#axzz1RAPfeGsO

This conventional wisdom is valid most, but not all of the time. There are rare occasions, such as today, when we should think of the unemployment rate as much more than a lagging indicator; it has the potential to **influence future economic behaviours** and outlooks. Today’s broader interpretation is warranted by two factors: the speed and extent of the recent rise in the unemployment rate; and, the likelihood that it will persist at high levels for a prolonged period of time. As a result, the unemployment rate will increasingly disrupt an economy that, hitherto, has been influenced mainly by large-scale dislocations in the financial system. In just 16 months, the US unemployment rate has doubled from 4.8 per cent to 9.5 per cent, a remarkable surge by virtually any modern-day metric. It is also likely that the 9.5 per cent rate understates the extent to which labour market conditions are deteriorating. Just witness the increasing number of companies asking employees to take unpaid leave. Meanwhile, after several years of decline, the labour participation rate has started to edge higher as people postpone their retirements and as challenging family finances force second earners to enter the job market. Notwithstanding its recent surge, the unemployment rate is likely to rise even further, reaching 10 per cent by the end of this year and potentially going beyond that. Indeed, the rate may not peak until 2010, in the 10.5-11 per cent range; and it will likely stay there for a while given the lacklustre shift from inventory rebuilding to consumption, investment and exports. Beyond the public sector hiring spree fuelled by the fiscal stimulus package, the post-bubble US economy faces **considerable headwinds** to sustainable job creation. It takes time to restructure an economy that became over-dependent on finance and leverage. Meanwhile, companies will use this period to shed less productive workers. This will disrupt consumption already reeling from a large negative wealth shock due to the precipitous decline in house prices. Consumption will be further undermined by uncertainties about wages. This possibility of a very high and persistent unemployment rate is not, as yet, part of the mainstream deliberations. Instead, the persistent domination of a “mean reversion” mindset leads to excessive optimism regarding how quickly the rate will max out, and how fast it converges back to the 5 per cent level for the Nairu (non-accelerating inflation rate of unemployment). The US faces a material probability of both a higher Nairu (in the 7 per cent range) and, relative to recent history, a much slower convergence of the actual unemployment rate to this new level. This paradigm shift will complicate an already complex challenge facing policymakers. They will have to recalibrate fiscal and monetary stimulus to recognise the fact that “temporary and targeted” stimulus will be less potent than anticipated. But the inclination to increase the dose of stimulus will be tempered by the fact that, as the fiscal picture deteriorates rapidly, the economy is less able to rely on future growth to counter the risk of a debt trap. Politics will add to the policy complications. The combination of stubbornly high unemployment and growing government debt will not play well. The rest of the world should also worry. Persistently high unemployment **fuels protectionist tendencies**. Think of this as yet another illustration of the fact that the US economy is on a bumpy journey to a new normal. The longer this reality is denied, the greater will be the cost to society of restoring economic stability.

### The impact is great power conflict and nuclear terrorism

Panzner 8 **-**faculty at the New York Institute of Finance, 25-year veteran of the global stock, bond, and currency markets who has worked in New York and London for HSBC, Soros Funds, ABN Amro, Dresdner Bank, and JPMorgan Chase

Michael, Financial Armageddon: Protect Your Future from Economic Collapse, Revised and Updated Edition, p. 136-138

Continuing calls for curbs on the flow of finance and trade will inspire the United States and other nations to spew forth protectionist legislation like the notorious Smoot-Hawley bill. Introduced at the start of the Great Depression, it triggered a series of tit-for-tat economic responses, which many commentators believe helped turn a serious economic downturn into a prolonged and devastating global disaster, But if history is any guide, those lessons will have been long forgotten during the next collapse. Eventually, fed by a mood of desperation and growing public anger, restrictions on trade, finance, investment, and immigration will almost certainly intensify.   Authorities and ordinary citizens will likely scrutinize the cross-border movement of Americans and outsiders alike, and lawmakers may even call for a general crackdown on nonessential travel. Meanwhile, many nations will make transporting or sending funds to other countries exceedingly difficult. As desperate officials try to limit the fallout from decades of ill-conceived, corrupt, and reckless policies, they will introduce controls on foreign exchange, foreign individuals and companies seeking to acquire certain American infrastructure assets, or trying to buy property and other assets on the (heap thanks to a rapidly depreciating dollar, will be stymied by limits on investment by noncitizens. Those efforts will cause spasms to ripple across economies and markets, disrupting global payment, settlement, and clearing mechanisms. All of this will, of course, continue to undermine business confidence and consumer spending.  In a world of lockouts and lockdowns, any link that transmits systemic financial pressures across markets through arbitrage or portfolio-based risk management, or that allows diseases to be easily spread from one country to the next by tourists and wildlife, or that otherwise facilitates unwelcome exchanges of any kind will be viewed with suspicion and dealt with accordingly.  The rise in isolationism and protectionism will bring about ever more heated arguments and **dangerous confrontations** over shared sources of oil, gas, and other **key commodities** as well as factors of production that must, out of necessity, be acquired from less-than-friendly nations. Whether involving raw materials used in strategic industries or basic necessities such as food, water, and energy, efforts to secure adequate supplies will take increasing precedence in a world where demand seems constantly out of kilter with supply. Disputes over the misuse, overuse, and pollution of the environment and natural resources will become more commonplace. Around the world, such tensions will give rise to full-scale military encounters, often with minimal provocation.  In some instances, economic conditions will serve as a convenient pretext for conflicts that stem from cultural and religious differences. Alternatively, nations may look to divert attention away from domestic problems by channeling frustration and populist sentiment toward other countries and cultures. Enabled by cheap technology and the waning threat of American retribution, terrorist groups will likely boost the frequency and scale of their horrifying attacks, bringing the threat of random violence to a whole new level.  Turbulent conditions will encourage aggressive saber rattling and interdictions by rogue nations running amok. Age-old clashes will also take on a new, more healed sense of urgency. China will likely assume an increasingly belligerent posture toward Taiwan, while Iran may embark on overt colonization of its neighbors in the Mideast. Israel, for its part, may look to draw a dwindling list of allies from around the world into a growing number of conflicts. Some observers, like John Mearsheimer, a political scientist at the University of Chicago, have even speculated that an "intense confrontation" between the United States and China is "inevitable" at some point.  More than a few disputes will turn out to be almost wholly ideological. Growing cultural and religious differences will be transformed from wars of words to battles soaked in blood. Long-simmering resentments could also degenerate quickly, spurring the basest of human instincts and triggering genocidal acts. Terrorists employing biological or nuclear weapons will vie with conventional forces using jets, cruise missiles, and bunker-busting bombs to cause widespread destruction. Many will interpret stepped-up conflicts between Muslims and Western societies as the beginnings of a new world war.

### Fourth – space leadership – Technological and strategic *capabilities* are the *foundations* for US space leadership – this is comparatively more likely to produce peace than a “cooperation first” approach

Stone 11 - space policy analyst and strategist, MBA from Georgetown

Chris Stone, 3-2011, “American leadership in space: leadership through capability,” http://www.thespacereview.com/article/1797/1

When it comes to space exploration and development, including national security space and commercial, I would disagree somewhat with Mr. Friedman’s assertion that space is “often” overlooked in “foreign relations and geopolitical strategies”. My contention is that while space is indeed overlooked in national grand geopolitical strategies by many in national leadership, space is used as a tool for foreign policy and relations more often than not. In fact, I will say that the US space program has become less of an effort for the advancement of US space power and exploration, and is used more as a foreign policy tool to “shape” the strategic environment to what President Obama referred to in his National Security Strategy as “The World We Seek”. Using space to shape the strategic environment is not a bad thing in and of itself. What concerns me with this form of “shaping” is that we appear to have changed the definition of American leadership as a nation away from the traditional sense of the word. Some seem to want to base our future national foundations in space using the important international collaboration piece as the starting point. Traditional national leadership would start by advancing United States’ space power capabilities and strategies first, then proceed toward shaping the international environment through allied cooperation efforts. The United States’ goal should be **leadership through spacefaring capabilities**, in all sectors. Achieving and maintaining such leadership through capability will allow for increased space security and opportunities for all and for America to lead the international space community by both technological and political example. The world has recognized America as the leaders in space because it demonstrated technological advancement by the Apollo lunar landings, our deep space exploration probes to the outer planets, and deploying national security space missions. We did not become the recognized leaders in astronautics and space technology because we decided to fund billions into research programs with no firm budgetary commitment or attainable goals. We did it because we made a **national level decision** to do each of them, stuck with it, and achieved exceptional things in manned and unmanned spaceflight. We have allowed ourselves to drift from this traditional strategic definition of leadership in space exploration, rapidly becoming participants in spaceflight rather than the leader of the global space community. One example is shutting down the space shuttle program without a viable domestic spacecraft chosen and funded to commence operations upon retirement of the fleet. We are paying millions to rely on Russia to ferry our astronauts to an International Space Station that US taxpayers paid the lion’s share of the cost of construction. Why would we, as United States citizens and space advocates, settle for this? The current debate on commercial crew and cargo as the stopgap between shuttle and whatever comes next could and hopefully will provide some new and exciting solutions to this particular issue. However, we need to made a decision sooner rather than later. Finally, one other issue that concerns me is the view of the world “hegemony” or “superiority” as dirty words. Some seem to view these words used in policy statements or speeches as a direct threat. In my view, each nation (should they desire) should have freedom of access to space for the purpose of advancing their “security, prestige and wealth” through exploration like we do. However, to maintain leadership in the space environment, space superiority is a worthy and necessary byproduct of the traditional leadership model. If your nation is the leader in space, it would pursue and maintain superiority in their mission sets and capabilities. In my opinion, space superiority does not imply a wall of orbital weapons preventing other nations from access to space, nor does it preclude international cooperation among friendly nations. Rather, it indicates a desire as a country to achieve its goals for national security, prestige, and economic prosperity for its people, and to be known as the best in the world with regards to space technology and astronautics. I can assure you that many other nations with aggressive space programs, like ours traditionally has been, desire the same prestige of being the best at some, if not all, parts of the space pie. Space has been characterized recently as “congested, contested, and competitive”; the quest for excellence is just one part of international space competition that, in my view, is a good and healthy thing. As other nations pursue excellence in space, we should take our responsibilities seriously, both from a national capability standpoint, and as country who desires expanded international engagement in space. If America wants to retain its true leadership in space, it must approach its space programs as the advancement of its national “security, prestige and wealth” by maintaining its edge in spaceflight capabilities and use those demonstrated talents to advance international prestige and influence in the space community. These energies and influence can be channeled to create the international space coalitions of the future that many desire and benefit mankind as well as America. Leadership will require sound, long-range exploration strategies with national and international political will behind it. American leadership in space is not a choice. It is a requirement if we are to truly lead the world into space with programs and objectives “worthy of a great nation”.

### Don’t confuse leadership with dominance or marginalization – US leadership is the *only way* to generate international cooperation

Smith 11 – Colonel, PhD Candidate @ Reading in UK

Colonel M.V. Smith, PhD student in the strategic studies program under Professor Colin Gray at the University of Reading in the UK, former Chief of Future Concepts (Dream Works) for the National Security Space Office at the Pentagon, 3-2011, Comment on a Space Review article written by Christopher Stone (MBA Georgetown), http://www.thespacereview.com/article/1797/1

Mr Stone makes a brilliant point in this article that I'd like to highlight and emphasise. "American leadership in space" **does NOT imply** dominance or hegemony, as many detractors assert. It simply means being the best at spacefaring activities. Unless America is recognised as the **best at key spacefaring capabilities**, **no one will** care to **partner with us** **for any reason** other than to constrain our freedom of action and to pick our pockets of classified data and intellectual property. Being the best means doing things routinely that others cannot, and promoting the operational and industrial bases that produce such performance. Ignoring the strategic importance of national spacepower across the civil and security sectors has resulted in failure to make timely decisions. As Mr Stone points out, we now have no way to lift astronauts to the ISS, but we also have allowed our space industrial base to atrophy in several critical areas.

### Specifically – Space leadership is *necessary leverage* to promote peaceful cooperation

Hawley 9 – Professor of Physics @ Kansas

Steve Hawley, “There are No Shortcuts to Human Space Exploration,” 2009, Space News

Our **space leadership** is a projection of this country’s technical capability **leveraged to** **foster peaceful cooperation** among nations in a politically uncertain world. Each of us has been part of this great space legacy — and continues to be committed to ensuring the safety, vitality, sustainability and excitement of the future space program. United States investment in space and technology generates tens of thousands of jobs, stimulates small businesses and entrepreneurship, drives innovation and inspires the next generation of engineers, scientists and explorers so critical to America’s future.

### That solves a laundry list of extinction threats

Jervis 9 – Professor of International Politics

Robert, professor of international politics at Columbia University, Unipolarity: A Structural Perspective, World Politics, Muse

To say that the system is **unipolar** is not to argue that the unipole can get everything it wants or that it has no need for others. American power is very great, but it is still subject to two familiar limitations: it is harder to build than to destroy, and success usually **depends on others’** decisions. This is particularly true of the current system because of what the U.S. wants. If Hitler had won World War II, he might have been able to maintain his system for some period of time with little cooperation from others because “all” he wanted was to establish the supremacy of the Aryan race. The U.S. wants not only to prevent the rise of a peer competitor but also to stamp out terrorism, maintain an open international economic system, spread democracy throughout the world, and establish a high degree of cooperation among countries that remain juridically equal. Even in the military arena, the U.S. cannot act completely alone. **Bases and overflight** rights are always needed, and support from allies, especially Great Britain, is important to validate military action in the eyes of the American public. When one matches American forces, not against those of an adversary but against the tasks at hand, they often fall short.[54](http://muse.jhu.edu/journals/world_politics/v061/61.1.jervis.html#f54) Against terrorism, force is ineffective without excellent intelligence. Given the international nature of the threat and the difficulties of gaining information about it, **international cooperation is the only route to success**. The maintenance of international prosperity also requires joint efforts, even leaving aside the danger that other countries could trigger a run on the dollar by cashing in their holdings. Despite its lack of political unity, Europe is in many respects an economic unit, and one with a greater gdp than that of the U.S. Especially because of the growing Chinese economy, economic power is spread around the world much more equally than is military power, and the open economic system [End Page 210] could easily disintegrate **despite continued unipolarity**. In parallel, on a whole host of problems such as aids, poverty, and international crime (even leaving aside climate change), the unipole can lead and exert pressure but cannot dictate. **Joint actions may be necessary** to apply sanctions to various unpleasant and recalcitrant regimes; proliferation can be stopped only if all the major states (and many minor ones) work to this end; unipolarity did not automatically enable the U.S. to maintain the coalition against Iraq after the first Gulf War; close ties within the West are needed to reduce the ability of China, Russia, and other states to play one Western country off against the others. But in comparison with the cold war era, there are fewer incentives today for allies to cooperate with the U.S. During the earlier period unity and close coordination not only permitted military efficiencies but, more importantly, gave credibility to the American nuclear umbrella that protected the allies. Serious splits were dangerous because they entailed the risk that the Soviet Union would be emboldened. This reason for avoiding squabbles disappeared along with the USSR, and the point is likely to generalize to other unipolar systems if they involve a decrease of threats that call for maintaining good relations with the superpower. This does not mean that even in this particular unipolar system the superpower is like Gulliver tied down by the Lilliputians. In some areas opposition can be self-defeating. Thus for any country to undermine American leadership of the international economy would be to put its own economy at risk, even if the U.S. did not retaliate, and for a country to sell a large proportion of its dollar holding would be to depress the value of the dollar, thereby diminishing the worth of the country’s remaining stock of this currency. Furthermore, cooperation often follows strong and essentially unilateral action. Without the war in Iraq it is not likely that we would have seen the degree of cooperation that the U.S. obtained from Europe in combating the Iranian nuclear program and from Japan and the PRC in containing North Korea. Nevertheless, many of the American goals depend on **persuading others, not coercing them**. Although incentives and even force are not irrelevant to spreading democracy and the free market, at bottom this requires people to embrace a set of institutions and values. Building the world that the U.S. seeks is a political, social, and even psychological task for which unilateral measures are likely to be unsuited and for which American military and economic strength can at best play a supporting role. Success requires that others share the American vision and **believe that its leadership is benign**. [End Page 211]

## \*\*\*Resource Control Advantage\*\*\*

### Advantage \_\_ - Resource Control

### SPS ends US fossil fuel dependence

Bova 8 –award-winning editor and an executive in the aerospace industry

Ben, “TO THE NEXT PRESIDENT From Ben Bova,” 10-2008, http://www.benbova.com/presidentltr1.html

Once you enter the White House you will face enormous problems: an economy in recession, energy prices soaring, global warming that causes climate change and more powerful tropical storms, rising unemployment, terrorism and war. But you will have an asset that has been overlooked by previous administrations: the powerful technology that we have forged over half a century of space exploration. You can and should use our hard-earned capabilities in space to solve down-to-Earth problems. Space technology can help to cut our dependence on oil imported from overseas while at the same time generating whole new industries that could create millions of new jobs. Using our space assets properly could make you the most popular President since John F. Kennedy. Most Americans take our space technology for granted. They watch the Olympics live from Beijing and see hurricanes tracked by satellites, they put GPS systems in their cars, but they believe that our space program is mainly an expensive hobby for an elite community of scientists, with no payback to the average taxpayer. Getting nifty pictures from Mars is neat, but it doesnt buy any groceries or lower the price of gasoline. Meanwhile, the U.S. is shelling out some $700 billion per year for foreign oil. Some of this money supports terrorists and dictators such as Daniel Ortega in Nicaragua. With world demand for energy increasing, the cost of imported oil has nowhere to go but up, and the price for gasoline will head toward $10 per gallon during your Administration - unless you use the knowledge and technology we already have in hand to make a meaningful change for the better. Space technology can help us to do that. And create new jobs, whole new industries, while doing it. Energy is the key. If we want to pull our economy out of recession we must stop paying $700 billion a year for imported oil. If we want to save our environment from greenhouse warming and the inevitable climate change and devastating storms that come with it, we must move away from fossil fuels of all kinds and go to clean, renewable sources of energy. You will have to make some hard choices about energy. Nuclear power doesnt put greenhouse gases into the atmosphere, but it has its own problems with radioactive wastes. Hydrogen fuels burn cleanly, but hydrogen is expensive to produce and really difficult to distribute by pipeline. Wind power works in special locations, but most people dont want huge, noisy wind turbines where they live. Some have suggested building automobiles that are powered by electricity. The cars would be clean-running, but how will we generate the additional electricity needed to power millions of “plug in” cars? How will we fuel the new powerplants we would need? Solar energy has long been a favorite of environmentalists. The Sun delivers about a kilowatt per square yard to the ground all across America. Put solarvoltaic cells on your roof and you can generate all the electricity you need. But only when the Sun is shining. Clouds and night make solar energy a part-time solution, at best. And solar energy cannot supply the base-load needs of factories and densely-populated cities. This is where space technology comes in. There is a way to use solar energy for base-load power generation, twenty-four hours a day, every day of the year. Place the solar cells in space, in high orbits where they are in sunshine all the time. The Sun beams out 386 billion billion megawatts of energy: thats 386,000,000,000,000,000,000,000,000 watts. Enormous energy! For comparison, the total installed electrical power generation capacity of the United States is slightly more than one million megawatts: the Sun emits 386 thousand billion times more. Of this steady and unfailing outpouring of sunlight, our planet Earth catches less than one part in two billion. Theres plenty of room for improvement! The concept of the Solar Power Satellite (SPS) was invented by Peter Glaser in 1968. The idea is basically very simple: build large assemblages of solar cells in space where they convert sunlight into electricity, and then beam the electricity they generate to receiving stations on the ground. The Solar Power Satellite is the ultimate clean energy source. It doesnt burn an ounce of fuel. Its powerplant is the Sun, 93 million miles away. A single SPS could deliver five to ten gigawatts to the ground. Thats five to ten thousand megawatts. The total electrical generation capacity of the entire state of California is 4.4 gigawatts. One SPS could deliver twice as much electrical power. With Solar Power Satellites you could cut back our need for imported oil, cut back our need for **fossil fuels of all kinds**. If this nation moves toward electric “plug-in” automobiles, a few SPSs could provide the increased electrical power we will need. Since they dont need any fuel, SPSs would have low operating costs. Conservative estimates have shown that a Solar Power Satellite could deliver electricity to the consumer at a cost of eight to ten cents per kilowatt/hour, which is quite competitive with costs from conventional power generation stations. And that would be for the earliest SPSs. Operating costs would drop as more orbital platforms are constructed and costs for components such as solarvoltaic cells are reduced. Solar Power Satellites could lower the average taxpayers electric bills, even while providing enormously more electricity than we can now can generate. Solar Power Satellites would be big, a mile across or more. But they dont require any new inventions. We have the basic technology in hand. Basically, an SPS needs solarvoltaic cells to convert sunlight into electricity and microwave transmitters to beam the energy to the ground. Weve been using solar cells to power spacecraft since the 1950s. Solar cells are in our pocket calculators, wristwatches, and other everyday gadgetry. You can buy solar cells through the Internet. Microwave transmitters are also a well-developed technology. Theres one in almost every kitchen in the nation, in the heart of our microwave ovens. Some people worry about beaming gigawatts of microwave energy to the ground. But the microwave beams would be spread over a wide area, so they wouldnt be intense enough to harm anyone. Birds could fly through the thinly-spread beams without harm. The receiving stations would be set up in unpopulated areas, nevertheless. The desert areas of the American southwest would make an ideal location for SPS receivers. You could gain votes in Arizona, New Mexico, Nevada and California! Its ironic, but when Solar Power Satellites become commonplace, the desert wastes of the Sahara and the Middle East could become important energy centers even after the last drop of oil has been pumped out of them. SPS receiving stations could also be built on platforms at sea: Japan has already looked into that possibility. Building mile-wide structures in space will certainly be a challenge, but we have learned how to construct the International Space Station, which is about the size of a football field. We have the basics in hand. Solar Power Satellites wont be cheap. Its been estimated that the construction cost of an SPS will be similar to the cost of building a nuclear powerplant: on the order of a billion dollars. That money neednt come from the taxpayers. It could be raised by the private capital market. Oil companies invest that kind of money every year on exploring for new oil fields. Private investors usually consider three factors before they plunk their dollars into a new venture. First, how big an investment is needed? Second, how risky is the project? Third, how long before I see a return on my investment? A billion-dollar investment isnt peanuts, although the private capital market raises that kind of money all the time. The risk involved with building an SPS is considerable, however. Although the basic technologies involved are well-known, space operations are inherently risky. Finally, it could be many years or even decades before an investment in SPS begins to pay off. How can we get private investors to put their money into Solar Power Satellites? This nation tackled a similar situation about a century ago, when faced with the problem of building big hydroelectric dams. Those dams were on the cutting edge of technology at the time, and they were risky endeavors that required hefty funding. Hoover Dam, the Grand Coulee and others were built with private investment backed by long-term, low-interest loans guaranteed by the U.S. government. Those dams changed the face of the American west, providing irrigation water and electrical power that stimulated enormous economic growth. Phoenix and Las Vegas wouldnt be on the map, except for those dams. The electricity that powered crucial parts of the Manhattan Project atomic bomb program came from those dams. Solar Power Satellites could be funded the same way, through government-back loans. Not a penny from the taxpayers pockets. The federal government has backed such loan guarantees in the past to help troubled corporations such as Chrysler and Lockheed. Why not use the same technique to encourage private investment in Solar Power Satellites? Moreover, a vigorous SPS program would provide a viable market for the private companies that are developing rocket launchers. Several companies are working on efficient, reliable launch vehicles that can bring down the costs of launching people and payloads into space. Like most new industries, they are caught in a conundrum: they need a market that offers a payoff, but no market will materialize until they can prove that their product works. The fledgling aircraft industry faced this conundrum in the 1920s. The federal government helped to provide a market for them by giving them contracts to deliver air mail. Out of that beginning arose eventually todays commercial airline industry. A vigorous SPS program could provide the market that the newborn private space-launch industry needs. And remember, a rocket launcher that can put people and payloads into orbit profitably can also fly people and cargo across the Earth at hypersonic speed. Anywhere on Earth can be less than an hours flight away. Thats a market worth trillions of dollar per year. ROI, indeed. It will take foresight and leadership to start a Solar Power Satellite program. The necessary technologies are at our fingertips; the vision to get the program going is what we need. Thats why, Mr. President-Elect, I believe you should make it NASAs primary goal to build and operate a demonstration model SPS before the end of your second term. The “demo” should be sized to deliver a reasonably impressive amount of electrical power to the ground: say ten to 100 megawatts. Such a demonstration will prove that full-scale SPSs are achievable. With federal loan guarantees, private financing will then take over and build SPSs that will deliver the gigawatts we need to lower our imports of foreign oil and begin to move away from fossil fuels.

### Specifically – a *fast and large* US investment turns the US into a *net energy exporter*

Chapman et al 11 – geophysicist and astronautical engineer who served as a NASA scientist astronaut during the Apollo Program

Phil, March, 2011, <http://solarhigh.org/Overview.html>

The expected cost of deploying SBSP is ~$7,400/kW, including the rectenna as well as construction and launch of Block II satellites. Amortized over an expected life of 30 years at a discount rate of 5%, the contribution of this capital cost to the delivered cost of electric energy would be 5.6 cents/kWh. SBSP is thus much more promising than terrestrial solar as a replacement for fossil fuels or nuclear power. A strong **US commitment** to SBSP could solve the **energy problem permanently**, in the USA and around the world. Offer clean, inexhaustible solar power almost anywhere on Earth. **Restore the status of the United States** as an energy-exporting nation. Create large international markets for export of our technology as well as energy. Offer greatly reduced launch costs to all users of space, including the DoD, NASA and commercial interests. **Restore US preeminence** in launch services. Permit explosive growth in extraterrestrial enterprises. Open the solar system as the domain of our species, eliminating most concerns about resource exhaustion. Serious studies of SBSP are under way in several countries, including Japan, China, India and the European Union. Continued US neglect of this vital technology means that we will not only suffer all the economic, political and strategic consequences of abdicating our leadership in space but also abandon control of our energy future. What we do about these issues in the next few years will determine whether we will restore American initiative or become a **debt-ridden, second-rate nation that must import electricity as well as petroleum.**

### Only SSP can meet demand rising demand – no other technology can come close

Nansen 10 – Former space engineer

Ralph Nansen, world leader in designing, developing and promoting Solar Power Satellites. Nansen spent 31 years with The Boeing Company, asked to testify before such Congressional committees as the Senate Space Subcommittee in 1976 and the House Subcommittee on Space and Aeronautics in 1978 and again in September 2000, 12-2010, “Low Cost Access to Space is Key to Solar Power Satellite Deployment,” http://spacejournal.ohio.edu/issue16/nansen.html

Today we face the compounding problems of a world recession, passing the peak of world oil production, global warming due to carbon dioxide in the atmosphere from burning fossil fuels, and the threat of **wars over Middle East oil.** The search is on for the new sources of energy required to support future economic and social development. Those sources must now pass a more strict set of criteria. They are expected to not only replace oil and coal to stop global warming, they must meet the growing global demand for energy that can be expected to rise each decade. Developing sources of renewable energy will meet some of the demand, but **only Solar Power Satellites** **will be able to deliver the quantities envisioned**. The United States currently consumes 25 percent of the world's oil usage, with only 5 percent of the population.[1] That ratio is about to dramatically change. James Michael Snead, President of the Spacefaring Institute LLC, writes that "…even if we use every source of clean energy --- terrestrial solar, wind, and geothermal --- and every source of dirty energy --- coal, oil, and nuclear --- we will run out of energy well before 2100."[2]

### This solves imperial conflict

Collina 5 - Executive Director of 20-20 Vision

Tom Z. Collina, Executive Director of 20-20Vision; testimony in front of Committee on Foreign Relations Subcommittee on Near Eastern and South Asian Affairs United States Senate “Oil Dependence and U.S. Foreign Policy: Real Dangers, Realistic Solutions”. October 19, 2005 <http://www.globalsecurity.org/military/library/congress/2005_hr/051020-collina.pdf>

More conflicts in the Middle East America imports almost 60% of its oil today and, at this rate, we’ll import 70% by 2025. Where will that oil come from? Two-thirds of the world’s oil is in the Middle East, primarily in Saudi Arabia, Iran and Iraq. The United States has less than 3% of global oil. The Department of Energy predicts that North American oil imports from the Persian Gulf will double from 2001 to 2025.i Other oil suppliers, such as Venezuela, Russia, and West Africa, are also politically unstable and hold no significant long-term oil reserves compared to those in the Middle East. Bottom line: our economy and security are increasingly dependent on one of the most unstable regions on earth. Unless we change our ways, we will find ourselves even more at the mercy of Middle East oil and thus more **likely to get involved in future conflicts**. The greater our dependence on oil, the greater the **pressure to protect and control that oil**. The growing American dependence on imported oil is the primary driver of U.S. foreign and military policy today, particularly in the Middle East, and motivates an aggressive military policy now on display in Iraq. To help avoid similar wars in the future and to encourage a more **cooperative, responsible, and multilateral** foreign policy the United States must **significantly reduce its oil use.** Before the Iraq war started, Anthony H. Cordesman of the Center for Strategic and International Studies said: “Regardless of whether we say so publicly, we will go to war, because Saddam sits at the center of a region with more than 60 percent of all the world's oil reserves.” Unfortunately, he was right. In fact, the use of military power to protect the flow of oil has been a central tenet of U.S. foreign policy since 1945. That was the year that President Franklin D. Roosevelt promised King Abdul Aziz of Saudi Arabia that the United States would protect the kingdom in return for special access to Saudi oil—a promise that governs U.S. foreign policy today. This policy was formalized by President Jimmy Carter in 1980 when he announced that the secure flow of oil from the Persian Gulf was in “the vital interests of the United States of America” and that America would use “any means necessary, including military force” to protect those interests from outside forces. This doctrine was expanded by President Ronald Reagan in 1981 to cover internal threats, and was used by the first President Bush to justify the Gulf War of 1990-91, and provided a key, if unspoken rationale for the second President Bush’s invasion of Iraq in 2003.ii The Carter/Reagan Doctrine also led to the build up of U.S. forces in the Persian Gulf on a permanent basis and to the establishment of the Rapid Deployment Force and the U.S. Central Command (CENTCOM). The United States now spends over $50 Billion per year (in peacetime) to maintain our readiness to intervene in the Gulf.iii America has tried to address its oil vulnerability by using our military to protect supply routes and to prop up or install friendly regimes. But as Iraq shows the price is astronomical—$200 Billion and counting. Moreover, **it doesn’t work**—Iraq is now producing less oil than it did before the invasion. While the reasons behind the Bush administration’s decision to invade Iraq may be complex, can anyone doubt that we would not be there today if Iraq exported coffee instead of oil? It is time for a new approach. Americans are no longer willing to support U.S. misadventures in the Persian Gulf. Recent polls show that almost two-thirds of Americans think the Iraq war was not worth the price in terms of blood and treasure. Lt. Gen William Odom, director of the National Security Agency during President Reagan's second term, recently said: "The invasion of Iraq will turn out to be the greatest strategic disaster in U.S. history." The nation is understandably split about what to do now in Iraq, but there appears to be widespread agreement that America should not make the same mistake again—and we can take **a giant step toward** that goal by **reducing our dependence on oil**.

### These wars go global

Schubert 10 – PhD in electrical engineering

Peter J. Schubert, PhD in electrical and computer engineering from Purdue University, holds 30 US patents, 8 foreign patents, and has published over 60 technical papers and book chapters, 12-2010, “Costs, Organization, and Roadmap for SSP,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/schubert.html

For a miracle to occur the US must perceive a real and on-going threat. Considering the most problematic areas listed above gives guidance on what sort of threats may arise. Environmental events may be roughly divided into regional disasters lasting days, weeks, or years (tsunamis, hurricanes, droughts); or decimating global weather shifts lasting generations (megavolcanic eruptions, ice age, runaway thermal superstorms). Either type threatens SSP. Regional disasters draw down funding coffers to provide immediate relief and possibly rebuilding; while decimations reduce commerce such that long-term, high-cost projects are no longer affordable. The same logic holds true for nuclear events, whether localized (Hiroshima, Nagasaki, Chernobyl), or widespread and generational (global thermonuclear war). Energy shortages will drive prices until economic necessity overcomes free market forces, and **wars erupt**. These may be regional, lasting years; or they may escalate **into a third Great War** over scarce energy sources. None of these options favor SSP.

### It’s not just fossil fuels – the plan solves US *SSP dependence*

Shea 10 – MA in Public Policy from GWU

Karen Shea, 12-2010, “Why Has SPS R&D Received So Little Funding?,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/shea.html

Space solar power technology is still in its infancy because of the lack of R&D funding and the absence of agency leadership. Since Dr. Peter E. Glaser came up with the idea for solar power satellites in 1968, this important solution to our global energy crisis has received only an estimated $80 million[1] in research funding. Both NASA and the DOE have had space solar power research programs but these have all been disbanded. How can agency interest in and funding for SSP be increased and sustained? How can launch costs be reduced sufficiently to make space solar power self-supporting so that agency support is no longer needed? Historical Perspective Over 40 years ago, Dr. Glaser of Arthur D. Little Company first proposed the concept of placing satellites in geosynchronous orbit to collect energy from the Sun for the purpose of transmitting the energy back to the earth. Possible implementation of Dr. Glaser's idea was studied by DOE and NASA during the 1970's. In 1975, the Goldstone Deep Space Communications Complex did experiments in wireless power transmission. In 1999, NASA undertook further review of space solar power. In 2007, the Pentagon's National Security Space Office issued a report on space based solar power that included a discussion of its use to power forward military bases. In 2008, the Discovery Channel aired a television documentary featuring John Mankins and his Japanese colleagues testing wireless power transmission between two Hawaiian Islands, a key space solar power technology. In 2009, Pacific Gas and Electric (PG&E) announced an agreement to buy 2000 MW of space solar power starting in 2016.[4] Also in 2009, the Japanese made SSP a national priority and indicated they may spend $21 billion to build a space solar power satellite over the next 30 years.[5] The United States is estimated to have invested $80 Million (adjusted for inflation) studying SPS since the idea was first proposed. This includes funding from DOE and NASA for 3 years during the 1970's[2] and the NASA funding in 1999 and 2000.[3] As a comparison, DOE is estimated to have invested $21 Billion in fusion energy research since the 1950s.[1] Space Solar Power has suffered from a policy dilemma. The Department of Defense (DOD) wants to use solar power satellites (SPS) to deliver electrical power to its forward military bases but that agency cannot build them, since SPS is clearly not in its mission. The DOD is developing lasers and microwave beams for offensive military purposes, but taking a lead in using lasers and microwaves for the beaming of electrical power would be politically unacceptable. The DOD is very interested in being an SSP customer because this satellite energy application would dramatically improve efficiency and reduce costs of supplying power to its troops in the field. Another consideration is in reducing costs in lives, as the generator fuel trucks are easy targets. Space solar power has been studied by both NASA and the DOE. Unfortunately, NASA considers SSP to be an energy issue and the DOE considers it to be a space issue. Neither is currently funding SSP research. Added to this, NASA is in crisis with the retirement of the Space Shuttle, while trying to operate the International Space Station and return to the Moon with a launch system that is behind schedule, over budget and losing capability. The 2009 Augustine Committee called for a $3 billion increase in the NASA budget just to keep up with its current commitments. NASA clearly cannot take the lead in SPS research and development. In the past, DOE has been interested in nuclear technology because of its connection to defense and DOE was interested in distributed systems for renewable energy. Now the DOE is putting emphasis on clean coal and biofuels. DOE has not shown any renewed interest in Solar Power Satellites. The DOE thinks launch costs are too high to ever be profitable, and space solar power is unproven both in terms of commercial viability and safety. To confirm safety and commercial viability requires funding. Many groups are working on reducing launch costs. SSP development should be funded in anticipation of launch cost reductions. Current Situation The timing would seem ideal for securing SPS development funding in today's world situation. Energy prices are rising at the same time that the demand for energy is increasing. Public and scientific concerns about climate change are growing based on current levels of carbon dioxide, accelerating in the burning of fossil fuels to meet energy requirements. Cap and Trade legislation and renewable energy mandates are being proposed. Also to be mentioned is the Japanese plan to spend $21 Billion on space solar power development and the Solaren contract in California with the utility Pacific Gas and Electric to deliver 200 megawatts of electrical energy from space starting in 2016. The questions now about SPS are mainly not if but specifically who, what, when, where and how best? For example, is solar voltaic or solar thermal the most efficient approach? Which are the best types of solar collectors to use? Which types of solar cells best balance cost, mass and durability issues? Which is the best wireless transmission method: lasers or microwaves? Where and how do we best build the receiving stations? What manufacturing techniques are most scalable? Which frequency is best for power beaming considering size, electronics, atmospheric and International Telecommunications Union issues? What safety precautions need to be taken with SPS? How can we transmit the power from place to place safely, efficiently and economically? When in this century will the cost of energy rise high enough and Moore's law reduce the cost of the technology sufficiently for space solar power to be profitable? Who will control the SPS market? In 2050, will the U.S. be buying power from space from the Japanese or selling it to Saudi Arabia? Which U.S. agency, if any, will take charge of this issue and invest in space solar power? Proposed Solution Since neither the DOE nor NASA considers space solar power to be in its mandate and each refuses to fund its development, maybe it is time for Americans to consider whether there are other U.S. government agencies that might see these developments within their mandate. The Department of Commerce is an agency that deals with space and is concerned about the nation's energy future. The Commerce Department currently hosts the National Oceanic and Atmospheric Administration (NOAA), one of the world's largest civilian space agencies. Commerce is concerned with all aspects of the U.S. economy and energy definitely affects the US economy. The Department of Commerce is the perfect agency to take the lead on space solar power. From its Web site, one can see that Commerce's mission includes "promoting the Nation's economic and technological advancement," "strengthening the international economic position of the United States," "improving comprehension and uses of the physical environment," and "ensuring effective use and growth of the Nation's scientific and technical resources." Space solar power development **will be key to U.S. future economic and technological development**. SPS is an excellent example of a way to help strengthen our international economic position, to improve use of our physical environment and effectively exploit our scientific and technical resources. Space solar power is clearly within the mandate of the Department of Commerce. Secretary of Commerce Gary Locke is in a good position from which to champion space solar power development. He was the two-time governor of the State of Washington; thus is very aware of the importance of aerospace to the U.S. economy since Boeing is a pillar of the state's economy. He has strong leadership skills. The Commerce Department currently hosts the Office of Space Commercialization, National Oceanic & Atmospheric Administration (NOAA), National Institute of Standards & Technology, National Telecommunications & Information Administration, National Technical Information Service and Economic Development Administration. All of these can be expected to contribute to and benefit from the effort to develop a system of Solar Power Satellites. The Office of Space Commercialization is presently the only civilian government group interested in space solar power. The Department of Commerce has a history of cooperation with both DOE and NASA. Today, NOAA works closely with NASA on its weather satellite launches. Gary Locke and Dr. Steven Chu, Secretary of the Department of Energy, work together well, making many joint appearances. If Commerce will fund SSP development, the issue of launch costs will still need to be addressed. Launching satellites and related materials into space has remained extremely expensive for decades because the current market isn't big enough to justify the major investment required to develop new technology. Given the potential size of this new energy source, it would make sense for the US government to put money into R&D. It would also help if the government subsidized launch costs for the first four full scale solar power satellites in return for a percent of the power produced for the life of the satellite. This could help to get the energy market moving in the direction of space. It may also help to address some of the power needs of our Department of Defense. To meet the demands of launching the components of four solar power satellites into geosynchronous orbit, the launch industry would have to rapidly up-size. Putting the power of the government behind this effort would assure development of improved facilities and technologies. Four satellites would allow the SSP technology to go through several generations of improvement while the market was being established. Once their capabilities are proven, with four electricity generating satellites in orbit, the industry will have a track record on which to secure investment capital for additional launches. It is hoped that because of the investment and new technologies applied launch costs will have been lowered. Significance Space solar power is stuck because of two dilemmas, the difficulty of finding an agency to fund space solar power and high launch costs. NASA considers space solar power to be energy and the Department of Energy considers space solar power to be space. Space solar power has such huge launch demands that present launch costs make it unaffordable. Part of the reason that launch costs are so high is that the launch market is small. Since the market for solar energy from space is huge, the U.S. government should subsidize the launch of the initial four solar power satellites to drive the launch industry to a new level of capability. The Department of Commerce should be given authority to take the lead in space solar power development. Space solar power has no serious technical issues standing in its way, but it is facing crippling policy dilemmas. By taking a new policy approach, we may be able to get out of a decades-long quagmire. Energy and space are within the mandate of the Department of Commerce. Help with the deployment of four full scale space solar power satellites will incentivize the launch industry to develop new technologies and more efficient techniques and facilities. The time is now for the development of space solar power. If the U.S. government commits to it as a matter of public policy, **a new SPS industry** will emerge, repaying the public investment many times over. If the U.S. does not do so, Japan, China, India or Russia will take the lead in space solar power development and the U.S. will continue to **send billions of dollars a year abroad** **to** **insure that our energy needs are met**.

### \*\*\*Insert trade deficit argument, depending on other advantages\*\*\*

## \*\*\*Global Resource Wars Advantage\*\*\*

### All major energy sources are finite – exhaustion is inevitable – only SSP can meet rising global demand

Snead 8 – MS in Aerospace Engineering

Mike Snead, MS in Aerospace Engineering from Air Force Institute of Technology, Past Chair of American Institute of Aeronautics and Astronautics, Former director of Science & Technology, HQ Air Force Materiel Command, Awarded Outstanding Achievement for Excellence in Research @ USAF, 11-19-2008, “The End of Easy Energy and What to Do About It,” http://mikesnead.net/resources/spacefaring/white\_paper\_the\_end\_of\_easy\_energy\_and\_what\_to\_do\_about\_it.pdf

By 2100, the number of people actually using electricity and modern fuels will more than double. Of the world’s current 6 .6 billion people, 2.4 billion do not have access to modern fuels and 1.6 billion do not have access to electricity. As a result, a substantial percentage of the world’s population lives in a state of energy deprivation that substantially impacts health, individual economic opportunity, social and political stability, and world security. By 2100, the world’s population is projected to climb another 3.4 billion to roughly 10 billion. This means that by 2100, an additional 5-6 billion people, not using modern fuels and electricity today, must be provided with assured, affordable, and sufficient energy supplies if the world’s current energy insecurity is to be substantially eliminated. 2. By 2100, to meet reasonable energy needs, the total world’s energy production of electricity and modern fuels must increase by a factor of about 3.4X while that of the United States must increase by a factor of 1.6X. The annual per capita total energy consumption of Japan, South Korea, and Europe averages about 30 barrels of oil equivalent or BOE. Further energy conservation may reduce this to about 27 BOE per year. This value is used in this paper as a level of energy consumption needed for a modern standard of living and a stable political and economic environment outside the United States. By 2100, should the non-U.S. world population achieve this modern “middle class” standard of living, the world will require an annual energy supply of around 280 billion BOE. In 2006, the world’s electricity and modern fuels energy supply was about 81 billion BOE. Hence, by 2100, the world will need on the order of 3 .4X more energy than was being produced in 2006. In the United States, a near doubling of the population by 2100, even with a 20% reduction in per capita energy use, will require a 1.6X increase in U.S. energy needs. 3. If oil, coal, and natural gas remain the predominant source of energy, both known and expected newly discovered reserves will be exhausted by 2100, **if** **not far earlier**. Of the 81 billion BOE produced each year from all energy sources, 86% or 70 billion BOE comes from non-renewable oil, coal, and natural gas. At this percentage, by 2100, the world would need about 240 billion BOE from oil, coal, and natural gas. With an annual average of about 155 billion BOE through the end of the century, the world would need about 14 ,100 billion BOE of oil, coal, and natural gas to reach the end of the century. Current proved recoverable reserves of oil, coal, and natural gas total only about 6 ,000 billion BOE. Expert estimates of additional recoverable reserves optimistically add another 6 ,000 billion BOE—for example, including nearly 3 ,000 billion BOE from all oil from oil shale—for a combined total of around 12 ,000 billion BOE. \* With increasing world energy consumption and if oil, coal, and natural gas continue to provide most of the world’s energy, known and new reserves of oil, coal, and natural gas will be exhausted by the end of the century, if not much earlier. To transform the world to primarily sustainable energy by 2100 to replace oil, coal, and natural gas, current sustainable energy sources must be scaled up from today by a **factor of 24.** By the end of the century—perhaps decades earlier—the world will need to obtain almost all of its energy from sustainable energy sources: nuclear and renewables. Today, the equivalent of about 11 billion BOE comes from sustainable energy sources. By 2100, the world must increase the production capacity of sustainable energy sources by a factor of about 24 to provide the equivalent of 280 billion BOE. The two primary sources of sustainable energy today are nuclear and hydroelectric. Today, the world has the sustainable energy equivalent of about 350 1-GWe (gigawattelectric) nuclear power plants and 375 2-GWe Hoover Dams. To meet the world’s 2100 need for 280 billion BOE of energy production, every four years through the end of the century, the world must add this amount of sustainable energy production in the form of nuclear, hydroelectric, geothermal, wind, solar, and biomass 5. Terrestrial sources of sustainable dispatchable electrical power generation will **fall significantly short** of U.S. and world needs by 2100 and, even, current U.S. needs. Energy is supplied in two primary forms: dispatchable electrical power to meet consumer needs for electricity and modern fuels to power transportation and other systems operating off the electrical power grid. By 2100, the world will need about 18 ,000 GWe of dispatchable electrical power generation capacity, compared with about 4,000 GW today, with almost all generated by sustainable sources. \* To assess the potential of nuclear fission and terrestrial renewables for meeting this world need, the addition of 1 ,400 1-GWe conventional nuclear fission reactors , the construction of the equivalent of 1 ,400 2 GWe Hoover Dams for added hydroelectric power generation, the addition of 1 ,900 GWe of geothermal electric power generation, and the expansion of wind-generated electrical power to 11 million commercial wind turbines, covering 1 .74 million sq. mi., would only be able to supply about 47% of the world’s 2100 need for dispatchable electrical power generation capacity. ‡ For the United States, only about 30% of the needed 2100 dispatchable electrical power generation capacity could be provided by these sustainable sources. By 2100, the U.S. and the world would be left with a dispatchable electrical power generation shortfall of 70% and 53%, respectively, with respect to this paper’s projection of the 2100 needs. Further, for the United States, the projected 2100 sustainable generation capacity would only provide about one-half of the current installed generation capacity that relies substantially on nonrenewable coal and natural gas Expanded conventional renewable sources of sustainable fuels—hydrogen, alcohol, bio-methane, and bio-solids—**will not be able to meet** the U.S.’s or the world’s 2100 needs for sustainable fuels. To assess the potential for conventional renewable sources of sustainable fuel for the entire world in 2100, hydrogen production from the electricity generated by nearly 600 ,000 sq. mi. of ground solar photovoltaic systems, hydrogen production from over 80% of the electrical power generated by 11 million wind turbines, and biofuels produced from 1 3,000 million tons of land biomass from the world’s croplands and accessible forestlands would only be able to supply about 37% of the world’s 2100 need for sustainable fuels. For the United States, by 2100, the situation is about the same with only about 39% of the 2100 needed fuels production capable of being provided from these conventional sustainable energy sources. As with sustainable electrical power generation, conventional sustainable U.S. fuels production at projected 2100 levels would fall well short of meeting current U.S. needs for fuel. Closing the U.S.’s and the world’s significant shortfalls in dispatchable electrical power will require **substantial additional generation capacity that can only be addressed through the use of space solar power**. Because of the substantial shortfall in needed 2100 fuels production, producing even more sustainable fuels to burn as a replacement for oil, coal, and natural gas to generate the needed additional electrical power is not practical. As a result, additional baseload electrical power generation capacity must be developed. The remaining potential sources of dispatchable electrical power generation are advanced nuclear energy and space solar power. While advanced nuclear energy certainly holds the promise to help fill this gap, fulfilling its promise has significant challenges to first overcome. Demonstrated safety; waste disposal; nuclear proliferation; fuel availability; and, for fusion and some fission approaches, required further technology development limit the ability to project significant growth in advanced nuclear electrical power generation. Space solar power (SSP)—involving the use of extremely large space platforms (20 ,000 or more tons each) in geostationary orbit (GEO) to convert sunlight into electrical power and transmit this power to large ground receivers—provides the **remaining large-scale baseload alternative**. Relying on SSP would require 1 ,854 5-GWe SSP systems to eliminate the world’s shortfall in needed 2100 dispatchable electrical power generation capacity. Of these, 244 SSP systems would be used to eliminate the U.S. shortfall in needed 2100 dispatchable electrical power generation capacity. The following two charts summarize this paper’s projection of the potential contribution of SSP in meeting the U.S.’s and the world’s dispatchable electrical power generation needs in 2100. 8. In addition to eliminating the dispatchable electrical power generation shortfall, SSP could, with algae biodiesel, eliminate the sustainable fuels production shortfall. Excess SSP electrical power can be used, when demand is less than the SSP generation capacity, to electrolyze water to produce hydrogen. Closed environment algae biodiesel production, done on the land under each SSP receiving antenna, combined with SSP hydrogen production can provide 24% and 19% of the United States’ and the world’s 2100 needed fuels production, respectively. The remaining fuels gap would be closed by warm-climate, open-pond algae biodiesel production. These two forms of sustainable fuels production—SSP hydrogen and algae biodiesel—would provide slightly more that 60% of this paper’s projection of the U.S.’s and the world’s 2100 needs for sustainable fuel production, as seen in the two charts below. Recognizing that the dedicated land area required in the United States to install the needed renewable energy production systems will be substantial, SSP provides one of the highest efficiencies in terms of renewable energy production capacity per sq. mi. of all the renewable alternatives. In the United States, 375,000 sq. mi.—about 12% of the continental United States—would be directly placed into use for renewable energy generation to meet this paper’s projection of 2100 energy needs. (For comparison, the U.S. arable and permanent cropland totals 680 ,000 sq. mi.) This land would be 100% covered with wind farms, ground solar photovoltaic systems, SSP receiving antennas, and open-pond algae biodiesel ponds. Of these four renewable energy options, SSP is one of the most land use efficient. The 244 SSP receiving antennas would require only about 20,000 sq. mi. or about 0.6% of the continental U.S., while providing nearly 70% of the dispatchable electrical power generation capacity and about 24% of the sustainable fuels production capacity by 2100. Key conclusions 1. Based on this assessment’s findings, a sound U.S. energy policy and implementation strategy should emphasize: Finding and producing more oil, coal, and natural gas to meet growing demand in order to minimize energy scarcity and price escalation during the generations-long transition to sustainable energy supplies; Adopting prudent energy conservation improvements to reduce the per capita energy needs of the United States, as well as the rest of the world, without involuntarily reducing the standard of living; Aggressively transitioning to conventional nuclear and terrestrial renewable energy sources to supplement and then replace oil, coal, and natural gas resources to avoid dramatic reductions in available per capita energy as non-renewable energy sources are exhausted this century; and, Aggressively developing advanced nuclear energy, space solar power energy, and open-pond/closed-environment algae biodiesel production to fill the substantial projected shortfalls in sustainable electrical power generation and fuels production that will develop even with optimistic levels of conventional nuclear and terrestrial renewable energy use. 2. While it is certainly easy to be disillusioned by these findings, this need not and should not be the case, especially in the United States. The world and the United States have successfully undergone a comparable transition in energy sources when wood was no longer sufficient to meet the growing needs of a rapidly industrializing world. When the transition to coal started in earnest in the 17 th century, steam power, electrical power, internal combustion, and nuclear energy where yet-to-be-invented new forms of energy conversion that now power the world. For about four centuries, technological development, economic investment, and industrial expansion— undertaken to realize the potential of “easy energy”—have been a foundation of the world’s growing standard of living and the emergence of the United States as a great power. Now, recognizing that the end of easy energy is at hand, the United States needs to aggressively move to expand existing sources of sustainable energy and develop and implement new sources to foster continued technological development, economic investment, and industrial expansion in the United States during the remainder of this century. It is critical that the United States **take a leadership position in the development of space solar power** as this may become the dominant electrical power generation capability for the world.

### SPS solves energy wars – proximate cause of 21st century conflict

-even perception of shortage leads to conflict -- which is a good answer to “no resource wars” defense

Dinerman 8 – DoD Consultant

Taylor Dinerman, DoD Consultant, 9-15-2008, “War, peace, and space solar power,” Space Review, http://www.thespacereview.com/article/1209/1

It was a little more than a month ago when the crisis in the Caucasus erupted. It will be years before historians sort out exactly how it started, but no one can deny that it ended with a classic case of Russia using massive military force to impose its will on a tiny but bothersome neighbor. In any case this little war has shocked the international space industry in more ways than one. While politicians in the US and Europe debate the best way to ensure access to the International Space Station (ISS), a more profound lesson from the crisis is evident. The world can no longer afford to depend upon easily disrupted pipelines for critical energy supplies. The one that ran from Azerbaijan through Georgia to Turkey was, no doubt, an important factor in setting off the events of August 2008. In the future other pipelines, such as the one that may run from the coast of Pakistan to western China, may be just as important and as vulnerable as the one that runs through Georgia. Removing this kind of infrastructure from its central role in the world’s energy economy would eliminate **one of the most dangerous motivations for war** that we may face in the 21st century. If the world really is entering into a new age of resource shortages—or even if these shortages are simply widely-held illusions—nations will naturally try their best to ensure that they will have free and reasonably priced access to the stuff they need to survive and to prosper. Some of the proposed regulations aimed at the climate change issue will inevitably make matters worse by making it harder for nations with large coal deposits to use them in effective and timely ways. The coming huge increase in demand for energy as more and more nations achieve “developed” status has been discussed elsewhere. It is hard to imagine that large powerful states such as China or India will allow themselves to be pushed back into relative poverty by a lack of resources or by environmental restrictions. The need for a wholly new kind of world energy infrastructure is not just an issue involving economics or conservation, but of **war and peace**. Moving a substantial percentage of the Earth’s energy supply off the planet will not, in and of itself, eliminate these kinds of dangers, but it will reduce them. Nations that get a large percentage of their electricity from space **will not have to fear** that their neighbors will cut them off from gas or coal supplies. The need for vulnerable pipelines and shipping routes will diminish.

### These wars go global

Schubert 10 – PhD in electrical engineering

Peter J. Schubert, PhD in electrical and computer engineering from Purdue University, holds 30 US patents, 8 foreign patents, and has published over 60 technical papers and book chapters, 12-2010, “Costs, Organization, and Roadmap for SSP,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/schubert.html

For a miracle to occur the US must perceive a real and on-going threat. Considering the most problematic areas listed above gives guidance on what sort of threats may arise. Environmental events may be roughly divided into regional disasters lasting days, weeks, or years (tsunamis, hurricanes, droughts); or decimating global weather shifts lasting generations (megavolcanic eruptions, ice age, runaway thermal superstorms). Either type threatens SSP. Regional disasters draw down funding coffers to provide immediate relief and possibly rebuilding; while decimations reduce commerce such that long-term, high-cost projects are no longer affordable. The same logic holds true for nuclear events, whether localized (Hiroshima, Nagasaki, Chernobyl), or widespread and generational (global thermonuclear war). Energy shortages will drive prices until economic necessity overcomes free market forces, and **wars erupt**. These may be regional, lasting years; or they may escalate **into a third Great War** over scarce energy sources. None of these options favor SSP.

### SSP lowers launch costs – prevents resource wars – the impact is extinction

-not based on completion – demonstration of feasibility of extra-terrestrial resources is sufficient

Collins and Autino 10 - \* Life & Environmental Science, Azabu University AND \*\* Andromeda Inc., Italy

Patrick and Adriano, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture and world peace,” Acta Astronautica 66 (2010) 1553–1562, Science Direct

The major source of social friction, including international friction, has surely always been unequal access to resources. People ﬁght to control the valuable resources on and under the land, and in and under the sea. The natural resources of Earth are limited in quantity, and economically accessible resources even more so. As the population grows, and demand grows for a higher material standard of living, industrial activity **grows exponentially**. The threat of resources becoming scarce has led to the concept of ‘‘Resource Wars’’. Having begun long ago with wars to control the gold and diamonds of Africa and South America, and oil in the Middle East, the current phase is at centre stage of world events today [37]. A particular danger of ‘‘resource wars’’ is that, if the general public can be persuaded to support them, they may become **impossible to stop** as resources become increasingly scarce. Many commentators have noted the similarity of the language of US and UK government advocates of ‘‘war on terror’’ to the language of the novel ‘‘1984’’ which describes a dystopian future of endless, fraudulent war in which citizens are reduced to slaves. 7.1. Expansion into near-Earth space is the only alternative to endless ‘‘resource wars’’ As an alternative to the ‘‘resource wars’’ already devastating many countries today, opening access to the unlimited resources of near-Earth space could clearly **facilitate world peace and security**. The US National Security Space Ofﬁce, at the start of its report on the potential of space-based solar power (SSP) published in early 2007, stated: ‘‘Expanding human populations and declining natural resources are potential sources of local and strategic conﬂict in the 21st Century, and many see energy as the foremost threat to national security’’ [38]. The report ended by encouraging urgent research on the feasibility of SSP: ‘‘Considering the timescales that are involved, and the exponential growth of population and resource pressures within that same strategic period, it is imperative that this work for ‘‘drilling up’’ vs. drilling down for energy security begins immediately’’ [38]. Although the use of extra-terrestrial resources on a substantial scale may still be some decades away, it is important to recognise that simply acknowledging its feasibility using known technology is the **surest way of ending the threat of resource wars**. That is, if it is assumed that the resources available for human use are limited to those on Earth, then it can be argued that resource wars are inescapable [22,37]. If, by contrast, it is assumed that the resources of space are economically accessible, this not only eliminates the need for resource wars, it can also preserve the beneﬁts of civilisation which are being eroded today by ‘‘resource war-mongers’’, most notably the governments of the ‘‘Anglo-Saxon’’ countries and their ‘‘neo-con’’ advisers. It is also worth noting that the $1 trillion that these have already committed to wars in the Middle-East in the 21st century is orders of magnitude more than the public investment needed to aid companies sufﬁciently to start the commercial use of space resources. Industrial and ﬁnancial groups which proﬁt from monopolistic control of terrestrial supplies of various natural resources, like those which proﬁt from wars, have an economic interest in protecting their proﬁtable situation. However, these groups’ continuing proﬁts are justiﬁed neither by capitalism nor by democracy: they could be preserved only by maintaining the pretence that use of space resources is not feasible, and by preventing the development of low-cost space travel. Once the feasibility of low-cost space travel is understood, ‘‘resource wars’’ are clearly foolish as well as tragic. A visiting extra-terrestrial would be pityingly amused at the foolish antics of homo sapiens using longrange rockets to ﬁght each other over dwindling terrestrial resources—rather than using the same rockets to travel in space and have the use of all the resources they need! 7.2. High return in safety from extra-terrestrial settlement Investment in low-cost orbital access and other space infrastructure will facilitate the establishment of settlements on the Moon, Mars, asteroids and in man-made space structures. In the ﬁrst phase, development of new regulatory infrastructure in various Earth orbits, including property/usufruct rights, real estate, mortgage ﬁnancing and insurance, trafﬁc management, pilotage, policing and other services will enable the population living in Earth orbits to grow very large. Such activities aimed at making near-Earth space habitable are the logical extension of humans’ historical spread over the surface of the Earth. As trade spreads through near-Earth space, settlements are likely to follow, of which the inhabitants will add to the wealth of different cultures which humans have created in the many different environments in which they live. Success of such extra-terrestrial settlements will have the additional beneﬁt of reducing the danger of human extinction due to planet-wide or cosmic accidents [27]. These horrors include both man-made disasters such as nuclear war, plagues or growing pollution, and natural disasters such as super-volcanoes or asteroid impact. It is hard to think of any objective that is more important than preserving peace. Weapons developed in recent decades are so destructive, and have such horriﬁc, long-term side-effects that their use should be discouraged as strongly as possible by the international community. Hence, reducing the incentive to use these weapons by rapidly developing the ability to use space-based resources on a large scale is surely equally important [11,16]. The achievement of this **depends on low space travel costs** which, at the present time, appear to be achievable only through the development of a vigorous space tourism industry. 8. Summary As discussed above, if space travel services had started during the 1950s, the space industry would be enormously more developed than it is today. Hence the failure to develop passenger space travel has seriously distorted the path taken by humans’ technological and economic development since WW2, away from the path which would have been followed if capitalism and democracy operated as intended. Technological know-how which could have been used to supply services which are known to be very popular with a large proportion of the population has not been used for that purpose, while waste and suffering due to the unemployment and environmental damage caused by the resulting lack of new industrial opportunities have increased. In response, policies should be implemented urgently to correct this error, and to catch up with the possibilities for industrial and economic growth that have been ignored for so long. This policy renewal is urgent because of the growing dangers of unemployment, economic stagnation, environmental pollution, educational and cultural decline, resource wars and loss of civil liberties which face civilisation today. In order to achieve the necessary progress there is a particular need for collaboration between those working in the two ﬁelds of civil aviation and civil space. Although the word ‘‘aerospace’’ is widely used, it is largely a misnomer since these two ﬁelds are in practice quite separate. True ‘‘aerospace’’ collaboration to realise passenger space travel will develop the wonderful profusion of possibilities outlined above.

## \*\*\*Warming Advantage\*\*\*

### Advantage \_\_ – Warming

### Warming is real and human induced – drastic emissions reductions are key to avoid dangerous climate disruptions

-now is key

-AR4 = IPCC

Somerville 11 – Professor of Oceanography @ UCSD

Richard Somerville, Distinguished Professor Emeritus and Research Professor at Scripps Institution of Oceanography at the University of California, San Diego, Coordinating Lead Author in Working Group I for the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 3-8-2011, “CLIMATE SCIENCE AND EPA'S GREENHOUSE GAS REGULATIONS,” CQ Congressional Testimony, Lexis

1n early 2007, at the time of the publication of WG1 of AR4, the mainstream global community of climate scientists already understood from the most recent research that the latest observations of climate change were disquieting. In the words of a research paper published at the same time as the release of AR4 WG1, a paper for which I am a co-author, "observational data underscore the concerns about global climate change. Previous projections, as summarized by IPCC, have **not exaggerated** but may in some respects even have **underestimated the change**" (Rahmstorf et al. 2007). Now, in 2011, more recent research and newer observations have demonstrated that climate change continues to occur, and in several aspects the magnitude and rapidity of observed changes frequently **exceed the estimates of earlier projections**, including those of AR4. In addition, the case for attributing much observed recent climate change to human activities is **even stronger now** than at the time of AR4. Several recent examples, drawn from many aspects of climate science, but especially emphasizing atmospheric phenomena, support this conclusion. These include temperature, atmospheric moisture content, precipitation, and other aspects of the hydrological cycle. Motivated by the rapid progress in research, a recent scientific synthesis, The Copenhagen Diagnosis (Allison et al. 2009), has assessed recent climate research findings, including: -- Measurements show that the Greenland and Antarctic ice-sheets are losing mass and contributing to sea level rise. -- Arctic sea-ice has melted far beyond the expectations of climate models. -- Global sea level rise may attain or exceed 1 meter by 2100, with a rise of up to 2 meters considered possible. -- In 2008, global carbon dioxide emissions from fossil fuels were about 40% higher than those in 1990. -- At today's global emissions rates, if these rates were to be sustained unchanged, after only about 20 more years, the world will no **longer have a reasonable chance** of **limiting warming** to less than 2 degrees Celsius, or 3.6 degrees Fahrenheit, above 19th-century pre-industrial temperature levels, This is a much- discussed goal for a maximum allowable degree of climate change, and this aspirational target has now been formally adopted by the European Union and is supported by many other countries, as expressed, for example, in statements by both the G-8 and G-20 groups of nations. The Copenhagen Diagnosis also cites research supporting the position that, in order to have a reasonable likelihood of avoiding the risk of **dangerous climate disruption**, defined by this 2 degree Celsius (or 3.6 degree Fahrenheit) limit, global emissions of greenhouse gases such as carbon dioxide must peak and then start to **decline rapidly** within the next five to ten years, reaching near zero well within this century.

### Prefer our scientific assessments over single scientists or fringe theories

Alley 10 – Professor of Geoscience @ Penn State

Richard, Professor of Geoscience @ Penn State, authored over 200 refereed scientific papers, which are "highly cited" according to a prominent indexing service, erved with distinguished national and international teams on major scientific assessment bodies, 11-17-2010, “CLIMATE CHANGE SCIENCE; COMMITTEE: HOUSE SCIENCE AND TECHNOLOGY;

SUBCOMMITTEE: ENERGY AND ENVIRONMENT,” CQ Congressional Testimony, Lexis

Background on Climate Change and Global Warming. Scientific assessments such as those of the National Academy of Sciences of the United States (e.g., National Research Council, 1975; 1979; 2001; 2006; 2008; 2010a; 2010b), the U.S. Climate Change Science Program, and the Intergovernmental Panel on Climate Change have for decades consistently found with increasingly high scientific confidence that human activities are **raising the concentration** of CO2 and other greenhouse gases in the atmosphere, that this has a warming effect on the climate, that the **climate is warming** as expected, and that the changes **so far are small** compared to those projected if humans burn much of the fossil fuel on the planet. The basis for expecting and understanding warming from CO2 is the fundamental physics of how energy interacts with gases in the atmosphere. This knowledge has been available for over a century, was greatly refined by military research after World War II, and is directly confirmed by satellite measurements and other data (e.g., American Institute of Physics, 2008; Harries et al., 2001; Griggs and Harries, 2007). Although a great range of ideas can be found in scientific papers and in statements by individual scientists, the scientific assessments by bodies such as the National Academy of Sciences **consider the full range** of available information. The major results brought forward are based on multiple lines of evidence provided by different research groups with different funding sources, and have repeatedly been tested and confirmed. Removing the work of any scientist or small group of scientists would still leave a strong scientific basis for the main conclusions. Ice Changes. There exists increasingly strong evidence for widespread, ongoing reductions in the Earth's ice, including snow, river and lake ice, Arctic sea ice, permafrost and seasonally frozen ground, mountain glaciers, and the great ice sheets of Greenland and Antarctica. The trends from warming are modified by effects of changing precipitation and of natural variability, as I will discuss soon, so not all ice everywhere is always shrinking. Nonetheless, **warming is important in the overall loss of ice**, although changes in oceanic and atmospheric circulation in response to natural or human causes also have contributed and will continue to contribute to changes. The most recent assessment by the IPCC remains relevant (Lemke et al., 2007). Also see the assessment of the long climatic history of the Arctic by the U.S. Climate Change Science Program (CCSP, 2009), showing that in the past warming has led to shrinkage of Arctic ice including sea ice and the Greenland ice sheet, and that sufficiently large warming has removed them entirely.

### SPS solves – it’s the only solution and warming is comparatively the largest risk

Hsu 10 – PhD in Engineering

Feng, PhD in Engineering, Former head of the NASA GSFC risk management function, and was the GSFC lead on the NASA-MIT joint project for risk-informed decision-making support on key NASA programs, has over 90 publications and is coauthor of two books and co-chair of several technical committees, 12-2010, “Harnessing the Sun: Embarking on Humanity's Next Giant Leap,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/hsu.html

It has become increasingly evident that facing and solving the multiple issues concerning energy is the **single most pressing problem** that we face as a species. In recent years, there has been extensive debate and media coverage about alternative energy, sustainable development and global climate change, but what has been missing (at least in the mainstream media) is the knowledge and point of view of scientists and engineers. From the scientists or engineers perspective, this paper discusses the prospects for mankind's technological capability and societal will in harnessing solar energy, and focuses on the issues of: 1) space based solar power (SBSP) development, and, 2) why it is imperative that we must harness the unparalleled power of the sun in a massive and unprecedented scale, which I believe will be humanity's next giant leap forward. Whether terrestrially based or space based, solar energy has not yet emerged as a significant solution in public discussions of global warming. Yet, among scientists and engineers and other visionaries, it is starting to be viewed as one of the most promising and viable ways to eventually remove human dependence on fossil fuels. Nearly three years ago at the Foundation For the Future (FFF) International Energy Conference, my presentation was one of the few that took a look back at energy use in human history[1]. In this paper, I would like to offer a brief summary of the various stages mankind has passed through in our quest for energy, and how long they lasted. To understand and fully appreciate the profound idea that humankind has and can continue to harness sun's energy, it is imperative for us to learn from the history of our civilization and from the perspective of human evolution, especially from those societies in crisis over energy. Previewing the history of human energy consumption and energy technologies, we can see that there were three such eras. In the early years of human presence on this planet, we relied on wood-generated energy, based on the burning of firewood, tree branches and the remains of agricultural harvests. Starting in the 1600s, our forefathers discovered the energy properties of coal, which taught us how to tap stored supplies of fossil fuels. Less than two hundred years later, about the middle of the 1800s, we found petroleum and learned to commercialize the use of oil and gas, which brought about our current industrial civilization. In the 20th century, society witnessed the dawn of electricity generation via hydro-power and atomic energy. Today, demand for energy continues to soar, but we're rapidly using up our supplies of easily accessible fossil fuels. What is more, a profound environmental crisis has emerged as the result of our total reliance on energy sources based on those fuels. In the 21st century, there is great uncertainty about world energy supplies. If you plot energy demand by year of human civilization on a terawatt scale, you will see the huge bump that occurred barely a hundred years ago (Figure 1). Before that, in the Stone Age, basically the cultivation of fire led to the emergence of agriculture, cooking, tool making, and all the early stages of human civilization. Now, after about 150 years of burning fossil fuels, the earth's 3 billion years' store of solar energy has been plundered. In my view, mankind must now embark on the next era of sustainable energy consumption and re-supply. The most obvious source of which is the mighty energy resource of our sun. Adequately guide and using human creativity and innovation; the 21st century will become the next great leap forward in human civilization by taming solar energy, transforming our combustion world economy into a lasting solar-electric world economy. In solving humanity's energy problems we must learn from our ancestors. Taming the natural forces of the sun will be much like our ancestors' early efforts to harness the power of wild fire. We must use common sense, as they did, developing the tools and technologies that address the needs of our time. The Romans used flaming oil containers to destroy the Saracen fleet in 670. In the same century, the Japanese were digging wells to a depth approaching 900 feet with picks and shovels in search of oil. By 1100, the Chinese had reached depths of more than 3,000 feet in search of energy. This happened centuries before the West had sunk its first commercial well in 1859 in Titusville, Pennsylvania. With all such human creativities in the past, the searching for energy has been driven by our combustion world economy, which focused primarily on what's beneath the surface of our planet - the secondary energy resources which originated from the power of our sun. Now it's time for mankind to lift their heads and start focusing our profound creativity in harnessing the sun and making our way into the energy technology frontiers in the sky. Solar Energy - The Ultimate Answer to Anthropogenic Climate Change The evidence of global warming is alarming. The potential for a catastrophic climate change scenario is dire. Until recently, I worked at Goddard Space Flight Center, a NASA research center in the forefront of space and earth science research. This Center is engaged in monitoring and analyzing climate changes on a global scale. I received first hand scientific information and data relating to global warming issues, including the latest dynamics of ice cap melting and changes that occurred on either pole of our planet. I had the chance to discuss this research with my Goddard colleagues, who are world leading experts on the subject. I now have no doubt global temperatures are rising, and that global warming is a serious problem confronting all of humanity. No matter whether these trends are due to human interference or to the cosmic cycling of our solar system, there are two basic facts that are crystal clear: a) there is overwhelming scientific evidence showing positive correlations between the level of CO2 concentrations in the earth's atmosphere with respect to the historical fluctuations of global temperature changes; and b) the overwhelming majority of the world's scientific community is in agreement about the risks of a potential catastrophic global climate change. That is, if we humans continue to ignore this problem and do nothing, if we continue dumping huge quantities of greenhouse gases into earth's biosphere, **humanity will be at dire risk**. As a technical and technology risk assessment expert, I could show with confidence that we face orders of magnitude more risk doing nothing to curb our fossil-based energy addictions than we will in making a fundamental shift in our energy supply. This is because the risks of a catastrophic anthropogenic climate change can be potentially **the extinction of human species**, a risk that is simply too high for us to take any chances. Of course, there will be economic consequences to all societies when we restrict the burning of fossil fuels in an effort to abate "global warming." What we are talking about are options and choices between risks. All human activities involve risk taking; we cannot avoid risks but only make trade-offs, hopefully choosing wisely. In this case, there has to be a risk-based probabilistic thought process when it comes to adopting national or international policies in dealing with global warming and energy issues. As the measure of risk is a product of "likelihood" and "consequence," when consequence or risk of a potential human extinction (due to catastrophic climate change) is to be compared with the potential consequence or risk of loss of jobs or slowing the growth of economy (due to restriction of fossil-based energy consumption), I believe **the choice is clear**. My view is that by making a paradigm shift in the world's energy supply over time through extensive R&D, technology innovations and increased production of renewable energy, we will create countless new careers and jobs and end up triggering the next level of economic development, the kind of pollution free industrial revolution mankind has never before seen. The aggravation and acceleration of a potential anthropogenic catastrophic global climate change, in my opinion, is **the number one risk** incurred from our combustion-based world economy. At the International Energy Conference in Seattle, I showed three pairs of satellite images as evidence that the earth glaciers are disappearing at an alarming rate.[2] Whether this warming trend can be reversed by human intervention is not clear, but this uncertainty in risk reduction doesn't justify the human inactions in adapting policies and countermeasures on renewable energy development for a sustainable world economy, and for curbing the likelihood of any risk event of anthropogenic catastrophic climate changes. **What is imperative** is that we start to do something in a significant way that has a chance to make a difference.

### Warming is an existential threat

Mazo 10 – PhD in Paleoclimatology from UCLA

Jeffrey Mazo, Managing Editor, Survival and Research Fellow for Environmental Security and Science Policy at the International Institute for Strategic Studies in London, 3-2010, “Climate Conflict: How global warming threatens security and what to do about it,” pg. 122

The best estimates for global warming to the end of the century range from 2.5-4.~C above pre-industrial levels, depending on the scenario. Even in the best-case scenario, the low end of the likely range is 1.goC, and in the worst 'business as usual' projections, which actual emissions have been matching, the range of likely warming runs from 3.1--7.1°C. Even keeping emissions at constant 2000 levels (which have already been exceeded), global temperature would still be expected to reach 1.2°C (O'9""1.5°C)above pre-industrial levels by the end of the century." Without early and severe reductions in emissions, the effects of climate change in the second half of the twenty-first century are **likely to be catastrophic** for the stability and security of countries in the developing world - not to mention the associated human tragedy. Climate change could even undermine the strength and stability of emerging and advanced economies, beyond the knock-on effects on security of widespread state failure and collapse in developing countries.' And although they have been condemned as melodramatic and alarmist, many informed observers believe that unmitigated climate change beyond the end of the century could pose an **existential threat** to civilisation." What is certain is that there is no precedent in human experience for such rapid change or such climatic conditions, and even in the best case adaptation to these extremes would mean profound social, cultural and political changes.

### Tipping points prevent adaptation – significant emission cuts are key

Hansen 8 – Professor of Earth and Environmental Science

James E. Hanson, head of the NASA Goddard Institute for Space Studies in New York City and adjunct professor in the Department of Earth and Environmental Science at Columbia University, Al Gore’s science advisor, “Briefing before the Select Committee on Energy Independence and Global Warming,” US House of Representatives, 6-23-2008, “Twenty years later: tipping points near on global warming,” <http://www.columbia.edu/~jeh1/2008/TwentyYearsLater_20080623.pdf>

Fast feedbacks—changes that occur quickly in response to temperature change—amplify the initial temperature change, begetting additional warming. As the planet warms, fast feedbacks include more water vapor, which traps additional heat, and less snow and sea ice, which exposes dark surfaces that absorb more sunlight. Slower feedbacks also exist. Due to warming, forests and shrubs are moving poleward into tundra regions. Expanding vegetation, darker than tundra, absorbs sunlight and warms the environment. Another slow feedback is increasing wetness (i.e., darkness) of the Greenland and West Antarctica ice sheets in the warm season. Finally, as tundra melts, methane, a powerful greenhouse gas, is bubbling out. Paleoclimatic records confirm that the long-lived greenhouse gases— methane, carbon dioxide, and nitrous oxide—all increase with the warming of oceans and land. These positive feedbacks amplify climate change over decades, centuries, and longer. The predominance of positive feedbacks explains why Earth’s climate has historically undergone large swings: feedbacks work in both directions, amplifying cooling, as well as warming, forcings. In the past, feedbacks have caused Earth to be whipsawed between colder and warmer climates, even in response to weak forcings, such as slight changes in the tilt of Earth’s axis.2 The second fundamental property of Earth’s climate system, partnering with feedbacks, is the great inertia of oceans and ice sheets. Given the oceans’ capacity to absorb heat, when a climate forcing (such as increased greenhouse gases) impacts global temperature, even after two or three decades, only about half of the eventual surface warming has occurred. Ice sheets also change slowly, although accumulating evidence shows that they can disintegrate within centuries or perhaps even decades. The upshot of the combination of inertia and feedbacks is that additional climate change is already “in the pipeline”: even if we stop increasing greenhouse gases today, more warming will occur. This is sobering when one considers the present status of Earth’s climate. Human civilization developed during the Holocene (the past 12,000 years). It has been warm enough to keep ice sheets off North America and Europe, but cool enough for ice sheets to remain on Greenland and Antarctica. With rapid warming of 0.6°C in the past 30 years, global temperature is at its warmest level in the Holocene.3 The warming that has already occurred, the positive feedbacks that have been set in motion, and the additional warming in the pipeline together have brought us to the **precipice of a planetary tipping point**. We are at the tipping point because the climate state includes large, ready positive feedbacks provided by the Arctic sea ice, the West Antarctic ice sheet, and much of Greenland’s ice. **Little additional forcing is needed** to trigger these feedbacks and magnify global warming. If we go over the edge, we will transition to an environment far outside the range that has been experienced by humanity, and there will be no return within any foreseeable future generation. Casualties would include more than the loss of indigenous ways of life in the Arctic and swamping of coastal cities. An intensified hydrologic cycle will produce both greater floods and greater droughts. In the US, the semiarid states from central Texas through Oklahoma and both Dakotas would become more drought-prone and ill suited for agriculture, people, and current wildlife. Africa would see a great expansion of dry areas, particularly southern Africa. Large populations in Asia and South America would lose their primary dry season freshwater source as glaciers disappear. A major casualty in all this will be wildlife.

## \*\*\*Military Dependence Advantage\*\*\*

### Advantage \_\_\_\_\_\_is: Black Gold

### The military is entirely dependent on petroleum, transition away is critical

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

The U.S. Department of Defense (DOD) must prepare now to transition smoothly to a future in which it does not depend on petroleum. This is no small task: up to 77 percent of DOD’s massive energy needs – and most of the aircraft, ground vehicles, ships and weapons systems that DOD is purchasing today – depend on petroleum for fuel.1 Yet, while many of today’s weapons and transportation systems are unlikely to change dramatically or be replaced for decades, the petroleum needed to operate DOD assets may not remain affordable, or even reliably available, for the lifespans of these systems. To ready America’s armed forces for tomorrow’s challenges, DOD should ensure that it can operate all of its systems on non-petroleum fuels by 2040. This 30-year timeframe reflects market indicators pointing toward both higher demand for petroleum and increasing international competition to acquire it. Moreover, the geology and economics of producing petroleum will ensure that the market grows tight long before petroleum reserves are depleted. Some estimates indicate that the current global reserve-to-production (R/P) ratio – how fast the world will produce all currently known recoverable petroleum reserves at the current rate of production – is less than 50 years.2 Thus, given projected supply and demand, we cannot assume that oil will remain affordable or that supplies will be available to the United States reliably three decades hence. Ensuring that DOD can operate on non-petroleum fuels 30 years from today is a conservative hedge against prevailing economic, political and environmental trends, conditions and constraints. It will take decades to complete this transition away from petroleum. However, DOD has already laid important groundwork. The development, testing and evaluation of renewable fuel conducted by the armed services to date mark the first steps in guaranteeing DOD’s long-term ability to meet its energy needs. DOD should build on this work and develop a strategy that guarantees its ability to operate worldwide in the event of petroleum scarcity or unavailability.

### And military readiness will collapse now, four warrants:

### First is force protection:

### Oil dependence allows rogue states leverage over U.S. foreign policy; and enemies to cherry pick our supply lines

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

The growing world demand for petroleum presents major geostrategic risks. High prices and rising demand are a boon to major suppliers and reserve holders such as Iran and Venezuela, which are unfriendly to the United States. It also affects the international behavior of rising powers such as China, which is on a quest to secure access to natural resources that is in turn expanding its influence around the globe. In Mexico, one of the top suppliers of petroleum to the United States, pipelines serve as an increasingly attractive target for dangerous cartels to fund activities that could undermine the Mexican government, destabilize the region and decrease U.S. homeland security.4 American foreign policy itself has been colored by its growing petroleum demands since the 1970s oil crises and subsequent declaration of the Carter doctrine, which stipulated that the United States would consider threats to the Persian Gulf region threats to its “vital interests” due to the strategic importance of its petroleum reserves.5 Dependence on petroleum for 94 percent of transportation fuel is also a dangerous strategic risk for the United States given the leverage oil can provide to supplier countries. Many European allies have experienced such leverage in action with Russia periodically threatening to reduce or cut off natural gas exports to countries highly reliant on their supplies (and in some cases carrying through with these threats). Similarly, national oil companies and OPEC can choose to increase or decrease their production rates to drive changes in the market. The more the United States reduces its dependence on petroleum, the better it can hedge against petroleum suppliers exerting political leverage over U.S. interests, including in times of crisis. At the operational level, heavy reliance on liquid fuels also constitutes a force protection challenge for DOD. Fuel supply convoys have been vulnerable to attack in both Iraq and Afghanistan, where the services have struggled to adapt to the challenges of terrorism, insurgency and violent extremism. In addition to minimizing these risks in the current wars, DOD must also conceptualize and plan for what the future will likely hold for America’s security. The Navy’s battle against pirates off the coast of the Horn of Africa foreshadows the littoral and unconventional challenges that await the United States in the coming decades, as populations continue to migrate toward the world’s coastal area. These types of problems often manifest at major shipping chokepoints (including petroleum transit chokepoints), and addressing them will include distinctive fueling requirements. The Air Force, likewise, confronts dramatic changes in manned and unmanned flight, in addition to the proliferation of space technologies, all of which could dramatically alter fuel needs. In another example, one recently published AirSea battle concept focused on China notes that the type of conflict it outlines could require hardening fueling infrastructure, improving aerial refueling, “stockpiling petrol, oil, and lubricants” and potentially “running undersea fuel pipelines between Guam, Tinian and Saipan.”6 As the character of warfare changes, DOD will have to continue to consider the attraction of fuel supply lines to opponents.

### Second is supply and demand:

### Petroleum demand will increase as reserves diminish, prices will skyrocket

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

DOD cannot be assured of continued access to the energy it needs at costs it can afford to pay over the long term. Today DOD meets its energy needs primarily through petroleum, which accounts for more than 77 percent of DOD’s total energy use.7 However, both demand and supply trends are likely to raise the price and perhaps even limit the availability of petroleum. The U.S. Energy Information Administration projects that world energy demand will grow from its 2007 level of 495.2 quadrillion British thermal units (Btu) to 738.7 quadrillion Btu by 2035 – a steep increase. If current trends continue, energy demand in non-OECD countries will grow more than four times faster than in OECD countries.8 Global petroleum demand has increased steadily from about 63 million barrels of oil per day in 1980 to more than 85 million barrels today, and will grow to 110.6 million barrels per day by 2035 if current trends hold.9 While global oil demand increases, the supply side of the equation is equally worrisome. At current production rates, the global R/P ratio is about 46 years (see Appendix I). Proved reserves (those recoverable under current conditions10) increasingly lie in the hands of national oil companies that are often hostile to U.S. interests. Venezuela, for example, holds over 100 years’ equivalent of reserves at its current production rates. Thus, the U.S. reliance on countries such as Venezuela as a supplier could increase beyond the roughly 1 million barrels of petroleum it already imports from there every day.11 The reserve part of this ratio may increase, but we can also be certain that the demand half of the ratio will increase, and likely at a faster pace. The United States is already moving past the era of nearly complete reliance on petroleum for transportation fuel. Though it will take several decades to make this transition, the country should take every opportunity to hasten progress given projections of tight markets and a heightened potential for competition. This transition will require careful investments that account for the potential economic, environmental and geopolitical tradeoffs involved with all energy sources.

### And rising costs decimate the DOD’s budget

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

The Department of Defense accounts for about 80 percent of the federal government's energy consumption, and its high dependence on petroleum-based fuels – the Defense Energy Support Center reported 132.5 million barrels in petroleum sales in fiscal year 2008, totaling nearly 18 billion dollars13 – means that its budget is subject to major oil price fluctuations.14 Petroleum price spikes negatively affect DOD’s budget and divert funds that could be used for more important purposes. As Secretary Gates said in 2008, “Every time the price of oil goes up by 1 dollar per barrel, it costs us about 130 million dollars.”15 In an era of constrained budgets, American security is best served by trying to hedge against future price fluctuations of this scale.

### Specifically rising costs tradeoff with all future procurements

Crowley et. al 7\*Thomas D. Crowley is a Policy Consultant for LMI \*\*Tonya D. Corrie is a policy consultant for LMI \*\*\*David B. Diamond is a policy consultant for LMI\*\*\*\*Stuart D. Funk is a policy Consultant for LMI\*\*\*\*\*Wilhelm A. Hansen, Andrea D. Stenhoff, and Daniel C. Swift are policy consultants for LMI\*\*\*\*\*\*LMI is a governmental consulting organization [<http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA467003>, april 2007, “Transforming the Way DOD Looks at Energy”]

The need to recapitalize obsolete and damaged equipment and to develop hightechnology systems to implement future operational concepts is growing. At the same time, the procurement accounts for DoD are constantly under pressure from the rising costs of nondiscretionary accounts in the DoD budget (fuel, manpower) and requirements for non-defense spending (social security, health care). In this pressurized fiscal environment, controlling operating costs is essential to enable the procurement of new capability needs. However, fuel costs and consumption trends are increasing the total operating costs of the force, and projected trends will create the need to make investments in additional logistics capability. Thus, investment for future combat capability must increasingly compete with growing operating costs and logistic support requirements. In addition to the financial planning challenge associated with energy market volatility, the inability to fully account for energy considerations in operational and force development analysis impacts the investment decisions necessary to build the future force. The real cost of fuel to DoD is more than just the DESC standard price used for programming, budgeting, and investment decisions. 22 To assess this difference, the Office of Program Analysis and Evaluation (PA&E) has been studying the delivered cost of fuel for the military. PA&E estimated the “wholesale” cost to each service and then added the costs incurred for “retail” delivery as well as other costs incurred by the services and agencies. For a fuel-type dependent standard cost of $2.29 to $2.32 per gallon, PA&E found that the composite costs per gallon are as follows: ¡ Air Force JP-8 (weighted cost)—$6.36 air delivery cost (9 percent of total)—$42.49 ¡ Army JP-8—$5.62 (wartime delivered cost not estimated due to variance in mission and escort requirements) 23 ¡ Navy JP-5 (weighted cost at sea)—$3.08 (airborne delivered cost not estimated due to data availability and variance in scenarios) ¡ Navy F-76 (weighted cost at sea)—$2.74. The PA&E brief emphasizes that efforts to refine the method and apply fully burdened fuel costs are ongoing and that more focus should be applied to the method than to the specific numbers. 24 The inability to estimate potential wartime costs applies a downward bias to these burdened fuel costs.

### And energy is the biggest internal link to the budget

Beach 11 \*Dr. Fred C. Beach is a Post-Doc Fellow at the Center for International Energy and Environmental Policy at The University of Texas at Austin. He is a retired Naval Officer and qualified Submariner, Naval Aviator, Surface Warfare Officer, and Acquisition Professional [<http://www.ensec.org/index.php?view=article&catid=114%3Acontent0211&id=281%3Adods-addiction-to-oil-is-there-a-cure&tmpl=component&print=1&page=&option=com_content&Itemid=374>, March 15th 2011, “DOD’s Addiction to Oil: Is there a Cure?”]

When it comes to reducing a budget, whether it is a fiscal budget or an energy budget, the biggest gains to be had are in the largest budget categories, and **for DoD that means the** operational **energy budget**. Over 70% of the energy consumed by DoD goes towards operations. This includes energy for aircraft, ships, tactical vehicles, and expeditionary bases used in training, deploying, and sustaining our armed forces around the world. Since operational forces are mobile by nature, they demand fuels with the highest possible energy density and transportability, namely petroleum based fuels. For moving large quantities of people and material around the world, the most “energy efficient” means is by ship and the least is by air. Conversely, the most “time efficient” means is just the opposite. As America and the rest of the industrialized world has become addicted to “just in time” and “overnight” delivery of every imaginable commodity, so has DoD. The US military’s consumption of petroleum in FY 2008 was 120 million barrels at a cost of approximately $16 billion, and roughly 73% of this petroleum was used for aviation.

### And adequate defense spending is critical to the perception of hegemony

Kagan 9 Robert Kagan works at the Carnegie Endowment for International Peace [2/6/9, Robert, “This is no time to cut defense budget,” The Miami Herald]

A reduction in defense spending this year would unnerve American allies and undercut efforts to gain greater cooperation. There is already a sense around the world, fed by irresponsible pundits here at home, that the United States is in terminal decline. Many fear that the economic crisis will cause the United States to pull back from overseas commitments. The announcement of a defense cutback would be taken by the world as evidence that the American retreat has begun.

This would make it harder to press allies to do more. The Obama administration rightly plans to encourage European allies to increase defense capabilities so they can more equitably share the burden of global commitments. This will be a tough sell if the United States is cutting its own defense budget. In Afghanistan, there are already concerns that the United States may be "short of breath." In Pakistan, the military may be tempted to wait out what its members perceive as America's flagging commitment to the region. A reduction in defense funding would feed these perceptions and make it harder for Obama's newly appointed special envoy, Richard Holbrooke, to press for necessary changes in both countries. · What worries allies cheers and emboldens potential adversaries. The Obama administration is right to reach out and begin direct talks with leaders in Tehran. But the already-slim chances of success will grow slimmer if Iranian leaders believe that the United States may soon begin pulling back from their part of the world. President Mahmoud Ahmadinejad's spokesman has already declared that the United States has lost its power -- just because President Obama said he is willing to talk. Imagine how that perception would be reinforced if Obama starts cutting funding for an already inadequately funded force

### Independently, adequate defense spending prevents wars around the globe

Kagan 11 Robert Kagan Senior is a fellow at Brookings [1/24/11 “The Price of Power: The benefits of U.S. defense spending far outweigh the costs,” Weekly Standard]

Today the international situation is also one of high risk. • The terrorists who would like to kill Americans on U.S. soil constantly search for safe havens from which to plan and carry out their attacks. American military actions in Afghanistan, Pakistan, Iraq, Yemen, and elsewhere make it harder for them to strike and are a large part of the reason why for almost a decade there has been no repetition of September 11. To the degree that we limit our ability to deny them safe haven, we increase the chances they will succeed. • American forces deployed in East Asia and the Western Pacific have for decades prevented the outbreak of major war, provided stability, and kept open international trading routes, making possible an unprecedented era of growth and prosperity for Asians and Americans alike. Now the United States faces a new challenge and potential threat from a rising China which seeks eventually to push the U.S. military’s area of operations back to Hawaii and exercise hegemony over the world’s most rapidly growing economies. Meanwhile, a nuclear-armed North Korea threatens war with South Korea and fires ballistic missiles over Japan that will someday be capable of reaching the west coast of the United States. Democratic nations in the region, worried that the United States may be losing influence, turn to Washington for reassurance that the U.S. security guarantee remains firm. If the United States cannot provide that assurance because it is cutting back its military capabilities, they will have to choose between accepting Chinese dominance and striking out on their own, possibly by building nuclear weapons. • In the Middle East, Iran seeks to build its own nuclear arsenal, supports armed radical Islamic groups in Lebanon and Palestine, and has linked up with anti-American dictatorships in the Western Hemisphere. The prospects of new instability in the region grow every day as a decrepit regime in Egypt clings to power, crushes all moderate opposition, and drives the Muslim Brotherhood into the streets. A nuclear-armed Pakistan seems to be ever on the brink of collapse into anarchy and radicalism. Turkey, once an ally, now seems bent on an increasingly anti-American Islamist course. The prospect of war between Hezbollah and Israel grows, and with it the possibility of war between Israel and Syria and possibly Iran. There, too, nations in the region increasingly look to Washington for reassurance, and if they decide the United States cannot be relied upon they will have to decide whether to succumb to Iranian influence or build their own nuclear weapons to resist it. In the 1990s, after the Soviet Union had collapsed and the biggest problem in the world seemed to be ethnic conflict in the Balkans, it was at least plausible to talk about cutting back on American military capabilities. In the present, increasingly dangerous international environment, in which terrorism and great power rivalry vie as the greatest threat to American security and interests, cutting military capacities is simply reckless. Would we increase the risk of strategic failure in an already risky world, despite the near irrelevance of the defense budget to American fiscal health, just so we could tell American voters that their military had suffered its “fair share” of the pain? The nature of the risk becomes plain when one considers the nature of the cuts that would have to be made to have even a marginal effect on the U.S. fiscal crisis. Many are under the illusion, for instance, that if the United States simply withdrew from Iraq and Afghanistan and didn’t intervene anywhere else for a while, this would have a significant impact on future deficits. But, in fact, projections of future massive deficits already assume the winding down of these interventions. Withdrawal from the two wars would scarcely make a dent in the fiscal crisis. Nor can meaningful reductions be achieved by cutting back on waste at the Pentagon—which Secretary of Defense Gates has already begun to do and which has also been factored into deficit projections. If the United States withdrew from Iran and Afghanistan tomorrow, cut all the waste Gates can find, and even eliminated a few weapons programs—all this together would still not produce a 10 percent decrease in overall defense spending. In fact, the only way to get significant savings from the defense budget—and by “significant,” we are still talking about a tiny fraction of the cuts needed to bring down future deficits—is to cut force structure: fewer troops on the ground; fewer airplanes in the skies; fewer ships in the water; fewer soldiers, pilots, and sailors to feed and clothe and provide benefits for. To cut the size of the force, however, requires reducing or eliminating the missions those forces have been performing. Of course, there are any number of think tank experts who insist U.S. forces can be cut by a quarter or third or even by half and still perform those missions. But this is snake oil. Over the past two decades, the force has already been cut by a third. Yet no administration has reduced the missions that the larger force structures of the past were designed to meet. To fulfill existing security commitments, to remain the “world’s power balancer of choice,” as Leslie Gelb puts it, to act as “the only regional balancer against China in Asia, Russia in eastern Europe, and Iran in the Middle East” requires at least the current force structure, and almost certainly more than current force levels. Those who recommend doing the same with less are only proposing a policy of insufficiency, where the United States makes commitments it cannot meet except at high risk of failure.

### Defense spending cuts hollow out the military, cuts off funding for training, equipment, modernization, forward deployments, and kills nuclear deterrence

Carafano 8 \*James Jay Carafano is a Senior Research Fellow for National Security and the Heritage Foundation [8/27/8 “Prepping the military for defeat,” The Virginian-Pilot]

AFTER the Vietnam War, respect for the military sank to an all- time low. In one survey, sanitation workers were the only profession Americans thought less of - and some considered that an insult to sanitation workers. Defense spending plummeted. The armed services "hollowed out," lacking the budgets to sustain modernization, training and readiness. By the end of the 1980s, however, after the Reagan-era military build-up, the military polled as the most admired institution in the nation. Even today, despite the political debates over the Long War on Terrorism, the armed forces remain highly respected. For that reason, many Pentagon experts believe that after Iraq and Afghanistan, Congress and the White House won't abandon the military they way they did before. They won't put readiness at risk again, right? Wrong. There are already plenty of troubling signs. The Navy is talking about tying up ships because they don't have enough sailors. The Army has artillery and engineer battalions that haven't practiced firing cannons or breaching a minefield in a long time. The Air Force might well have just lost its service secretary and chief of staff, not because of their alleged failure to exercise leadership but because they chaffed at accepting unrealistic budget projections. Washington officials probably will use the same excuses they did after Vietnam to justify reneging on their obligation to "provide for the common defense." They will argue that they can spend less on defense because they're so smart. They know exactly what the future holds, what the threats will be, how to handle them - and, miraculously, the cost of this defense will be exactly the paltry amount of money they're willing to spend. Such "smart spending" was what the Pentagon offered after Vietnam. Rather than rebuild the military and match the Soviets' conventional power, President Carter's Pentagon opted for an "offset" strategy. They would replace boots on the ground with smart weapons to offset Soviet numbers. This would be more effective - and coincidently cheaper. As Yale scholar Paul Bracken put it, "They got away with it because President Carter didn't want to buy anything. He was very interested in innovation as long as it didn't require purchasing military equipment." Some old Carter hands even have the temerity to argue the offset strategy helped win the Cold War. Nothing could be further from the truth. Many of the technologies they promoted never matured, or were fully deployed only after the Cold War ended. Indeed, Council on Foreign Relations defense analyst Stephen Biddle cogently argues much of the success of rebuilding of U.S. conventional forces had to do with the robust training and doctrine instituted in the 1980s, part of the Reagan-era effort along with growing the forces and buying new equipment that resulted in the war-winning Desert Storm military. There are already signs, however, that the old Carter arguments are coming back. Very smart people will argue that Washington can gut budgets, ignore the need to buy next generation platforms and short-change training and maintenance because they know exactly what to cut. Of course, first they will cut the things they don't want - politically incorrect systems such as missile defense, space-based weapons and modernized nuclear forces. Then they will wish away the wars they don't want to prepare for - insurgencies and conventional conflicts with regional powers. Finally, they will assume that America's enemies will be blinded by their brilliance and not prepare for exactly the kinds of wars Washington does not fund the military to fight. They will wind up preparing the military for defeat. The one initiative brilliant budget-cutters will not undertake is to provide robust, sustained funding of the armed services that will pay for current operations; maintain a trained and ready military for a range of missions; and modernize forces for the future. But that's exactly what needs to be done to keep the nation safe, free and prosperous in the 21st century.

### Third is hotspots:

### Oil dependence ensures that we can’t respond to global crises, it makes it too expensive to conduct ALL operations

Bender 7\*Bryan Bender is a Staff Reporter for the Boston Globe \*\*The study cited is from LMI a governmental consulting firm \*\*\*Milton R. Copulos is president of the national defense council foundation [<http://www.boston.com/news/nation/washington/articles/2007/05/01/pentagon_study_says_oil_reliance_strains_military/?page=2>, May 1st 2007, “Pentagon Study says oil reliance strains military”]

WASHINGTON -- A new study ordered by the Pentagon warns that the rising cost and dwindling supply of oil -- the lifeblood of fighter jets, warships, and tanks -- will make the US military's ability to respond to hot spots around the world "unsustainable in the long term." The study, produced by a defense consulting firm, concludes that all four branches of the military must "fundamentally transform" their assumptions about energy, including taking immediate steps toward fielding weapons systems and aircraft that run on alternative and renewable fuels. It is "imperative" that the Department of Defense "apply new energy technologies that address alternative supply sources and efficient consumption across all aspects of military operations," according to the report, which was provided to the Globe. Weaning the military from fossil fuels quickly, however, would be a herculean task -- especially because the bulk of the US arsenal, the world's most advanced, is dependent on fossil fuels and many of those military systems have been designed to remain in service for at least several decades. Moving to alternative energy sources on a large scale would "challenge some of the department's most deeply held assumptions, interests, and processes," the report acknowledges. But Pentagon advisers believe the military's growing consumption of fossil fuels -- an increasingly expensive and scarce commodity -- leaves Pentagon leaders with little choice but to break with the past as soon as possible. Compared with World War II, according to the report, the military in Iraq and Afghanistan is using 16 times more fuel per soldier. "We have to wake up," said Milton R. Copulos , National Defense Council Foundation president and an authority on the military's energy needs. "We are at the edge of a precipice and we have one foot over the edge. The only way to avoid going over is to move forward and move forward aggressively with initiatives to develop alternative fuels. Just cutting back won't work." The Pentagon's Office of Force Transformation and Resources, which is responsible for addressing future security challenges, commissioned LMI, a government - consulting firm, to produce the report. Called "Transforming the Way DoD Looks at Energy," the study is intended as a potential blueprint for a new military energy strategy and includes a detailed survey of potential alternatives to oil -- including synthetic fuels, renewable biofuels, ethanol, and biodiesel fuel as well as solar and wind power, among many others. The military is considered a technology leader and how it decides to meet future energy needs could influence broader national efforts to reduce dependence on foreign oil. The report adds a powerful voice to the growing chorus warning that, as oil supplies dwindle during the next half-century, US reliance on fossil fuels poses a serious risk to national security. "The Pentagon's efforts in this area would have a huge impact on the rest of the country," Copulos said. The Department of Defense is the largest single energy consumer in the country. The Air Force spends about $5 billion a year on fuel, mostly to support flight operations. The Navy and Army are close behind. Of all the cargo the military transports, more than half consists of fuel. About 80 percent of all material transported on the battlefield is fuel. The military's energy consumption has steadily grown as its arsenal has become more mechanized and as US forces have had to travel farther distances. In World War II, the United States consumed about a gallon of fuel per soldier per day, according to the report. In the 1990-91 Persian Gulf War, about 4 gallons of fuel per soldier was consumed per day. In 2006, the US operations in Iraq and Afghanistan burned about 16 gallons of fuel per soldier on average per day , almost twice as much as the year before. Higher fuel consumption is a consequence of the US military's changing posture in recent years. During the Cold War, US forces were deployed at numerous bases across the world; since then, the United States has downsized its force and closed many of its former bases in Asia and Europe. The Pentagon's strategic planning has placed a premium on being able to deploy forces quickly around the world from bases in the United States. The National Defense Strategy, which lays out the Pentagon's anticipated missions, calls for an increased US military presence around the globe to be able to combat international terrorist groups and respond to humanitarian and security crises. But aviation fuel consumption for example, has increased 6 percent over the last decade. And the report predicts that trend will continue. "The US military will have to be even more energy intense, locate in more regions of the world, employ new technologies, and manage a more complex logistics system," according to the report. "Simply put, more miles will be traveled, both by combat units and the supply units that sustain them, which will result in increased energy consumption." The costs of relying on oil to power the military are consuming an increasing share of the military's budget, the report asserts. Energy costs have doubled since the terrorist attacks of Sept. 11, 2001, it says, and the cost of conducting operations could become so expensive in the future that the military will not be able to pay for some of its new weapon systems. Ensuring access to dwindling oil supplies also carries a big price tag. The United States, relying largely on military patrols, spends an average of $44 billion per year safeguarding oil supplies in the Persian Gulf. And the United States is often dependent on some of the same countries that pose the greatest threats to US interests. Achieving an energy transformation at the Department of Defense "will require the commitment, personal involvement , and leadership of the secretary of defense and his key subordinates," the report says.

### Fourth is the fuel tether:

### DOD oil dependence straightjackets our forces and operational capacity, this hampers power projection and makes our military posture unsustainable

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The goal of our security strategies is to shape the future security environment favorably to support our national interests, principles, freedoms, and way of life. However, our nation’s and DoD’s current and future growing dependence on foreign energy sources and the need to ensure their continued availability limit our ability to shape the future security environment. Protecting foreign energy sources will have an increasing impact on DoD’s roles and missions, at the expense of other security needs, potentially dictating the time and place of future conflict if action is not taken to change the trend and mitigate the effects of future reductions in the supply of oil. The security and military strategies for DoD require an energy-intense posture for conducting both deterrence and combat operations. The strategies rely on persistent presence globally, mobility to project power and sustain forces, and dominant maneuver to swiftly defeat adversaries. These current and future operating concepts tether operational capability to high-technology solutions that require continued growth in energy sources. Current consumption estimates, although based on incomplete data, validate these increasing fuel requirements and the implications for future operations. Clearly, the skill of our logistics forces in providing fuel has grown significantly since World War II. Still, we must be mindful of the operational implications of logistics requirements. The stalling of General Patton’s Third Army following its campaign across France in August and September 1944 is a telling example of the fuel “tether.” Despite the heroic efforts of logistics forces, the wear and tear on supply trucks and the strategic priority for fuel and logistics support in other areas of operations limited Patton to local operations for nearly 2 months. 20 The Defense Energy Support Center (DESC) estimates that 20,000 soldiers are employed to deliver fuel to operations (and spending $1 million per day to transport petroleum, which does not include fuel costs for contractor-provided combat support). The delivery of fuel poses such an operational and tactical risk that in July 2006, Maj. Gen. Richard Zilmer, the highest-ranking Marine Corps officer in Iraq’s Anbar Province, characterized the development of solar and wind power capabilities as a “joint urgent operational need.” General Zilmer cited reductions in often dangerous fuel transportation activities as the main motivation for this request: “By reducing the need for [petroleum-based fuels] at our outlying bases, we can decrease the frequency of logistics convoys on the road, thereby reducing the danger to our Marines, soldiers, and sailors.” 21 Operational capability is always the most important aspect of force development. However, it may not be possible to execute operational concepts and capabilities to achieve our security strategy if the energy implications are not considered. Current planning presents a situation in which the aggregate operational capability of the force may be unsustainable in the long term.

### SPS provides access to reliable secure energy and solves resource wars

NSSO 8\*National Space Security Office of the USFG [Space-Based Solar Power Study Group, Ad Astra, “Strategic Importance” Spring 2008, pg. 28, <http://www.nss.org/adastra/AdAstra-SBSP-2008.pdf>]

Like all species in a closed ecosystem, human civilization flourishes in times of new and plentiful resources and regresses in times of scarce supplies. Today, following more than a century of intense hydrocarbon use and six decades after Einstein’s remark, the human population exceeds six billion with projections of nearly ten billion by 2050. Conventional hydrocarbon energy resource peaks are all expected to occur well before mid-century; and rising CO2 levels may be unleashing an unprecedented global climate crisis. The 21st century is shaping up to be one of potential environment-and resource-driven conflict, and as the United States’ ultimate guarantor of national security, the Department of Defense (DoD) is keenly aware of this future scenario. History teaches us that the application of sufficient energy and imagination to almost any problem ultimately leads to solutions for a better future. Ensuring abundant long-term energy security then becomes a fundamental pursuit of all societies. Compared to Earth, the resources of space are infinite. In the Age of Exploration, Europe looked beyond the horizons of her surrounding oceans to solve a growing resource problem for a growing population. A similar timedistance problem separates human society today from the space resources needed to prevent its collapse and deliver the resources needed to support its ever-increasing levels of scale and complexity. While space already delivers ubiquitous telecommunication, global positioning, and surveillance commodities, these intangibles are higher-order services and not true life-sustaining resources. The first true resource delivered from space may very well be nearly limitless clean energy. Enter the four-decade-old concept of space solar power (SSP). Originally invented in 1968 by Dr. Peter Glaser of Arthur D. Little, and last validated in 2003 by the National Academy of Sciences’ National Research Council (NRC), SSP is a simple concept analogous to the hydroelectric dam as an energy-collection device. The traditional SSP architecture uti-lizes very large (kilometer-scale) photovoltaic arrays in geosynchronous Earth orbit (GEO) to convert a continuous stream of intense solar radiation into carbon-neutral electrical energy, which is then transmitted 24/7 through night and weather via microwave beams to collec-tion rectennas on Earth’s surface. In honor of its inventor, these space solar power satellites are sometimes fondly called, “Glasers.” Total calculated end-to-end system efficiency for base-load power approaches 10 percent- -remarkably high for any known natural or artificial energy production scheme. Varia- tions on the basic concept include using solar dynamic versus photovoltaic collection sys- tems, optical wavelength versus microwave power transmission, lunar versus orbital bas- ing, and low-Earth orbit versus GEO architec-tures. Despite their differences, all systems share a common philosophy with the hydro-electric power model: invest in a high-capital infrastructure expense up front to then enable decades of clean, reliable, low-maintenance and low unit-cost energy collection, free from the volatile fuel expenses and vulnerabilities of conventional energy systems. So why do we not have SSP satellites in orbit today when the NRC validated the concept as scientifically sound and on a healthy path toward technical feasibility as recently as five years ago? Over the course of 40 years the answer has always centered around “the busi-ness case” in the face of less-expensive com- peting conventional terrestrial energy sources. But that calculus is about to change. The very real risks of climate change, energy nationalism and scarcity, unconstrained technology explosion, and potential resource conflicts weigh heavily on the futurist minds of the action officers of the Air Force Future Con-cepts and Transformations Office and National Security Space Office (NSSO) “Dreamworks.” These officers are charged with visualizing the world 25-or-more years from now, and inform-ing and guiding Air Force and space strategy development. For a military that is fundamen-tally dependent on high-energy capabilities to protect its nation and the international com-mons for the good of all humanity, not only are the strategic risks associated with energy scarcity that lie ahead great, but so too are the operational and tactical vulnerabilities for the finest war-fighting and peacekeeping machine humans have ever known. It was from within this Air Force policy incubator and the NSSO that the spark to reexamine SSP as a strategic, operational, and tactical energy solution was struck. Beginning in the 1970s through 2001, the SSP was examined on multiple previous occasions by the Department of Energy (DOE) and NASA, but failed to find a champion in large part because SSP fell between organizational gaps (DOE does energy but not space, and NASA does space, not energy). On the other hand, because of its unique mission, DoD is the first government agency that will have to deal with the harsh realities of a coming energy peak. Self-developed, complex modern weapon systems spend two decades in pre-production and another five in operation— a 70-year life cycle that clearly places any new platforms (and our entire war-fighting doctrine) squarely on the backside of peak oil, and permanently in a hangar unless DoD can reinvent itself to remain relevant in an energy scarce world. Therefore, DoD is in a position of greatest need for examining all alternate energy options. On a more tactical level, the very real high cost in dollars and lives lost to deliver large quantities of fuel and energy supporting operations in Iraq and Afghanistan has informed the military that energy logistics is a reality that begs for a paradigm change. After concluding that most superficial observers of SSP casually and wrongly dismiss it either as science fiction or a complete economic infeasibility, a small group of motivated action officers from the Pentagon with science and technology, space, philosophy, operational, and strategy development backgrounds banded together (the self-anointed “Caballeros”) with several long-time SSP experts on a voluntary mission to educate the un-informed about the amazing potential of this almost-forgotten energy idea. Because the NRC had already verified NASA’s “Fresh Look Study” conclusion that SSP was not science fiction but instead just a very massive engineering challenge to solve, the Caballeros focused on how to demonstrate that SSP could in fact be economically feasible. While DOE and NASA had previously failed to close the SSP business case by examining energy as the only delivered revenue stream, DoD has a voracious demand for many different capabilities beyond just energy. These capabilities include command and control, persistent surveillance, operationally-responsive space access, space control, orbital debris removal, and in-space construction and maintenance of large structures. Recognizing that technical advances are occurring exponentially around the globe, and that history has shown time and again that deliberate and sustained innovation is the engine that drives true economic and political power, the “Eureka!” moment came with the realization that all of the previous business case analyses failed to include the economic and national security benefits of sure spin-off technologies and ancillary capabilities associated with deployment of a major SSP system. This list included not only the capabilities previously described, but also space infrastructure, low-cost reusable space access, orbital maneuver capabilities, broad-area space radar surveillance and telecommunication, and space-to-space and ground-to-ground power beaming. The ancillary benefit list was so remarkably large that it became nearly as important as the actual energy SSP could provide— no one in the DoD had ever viewed SSP through this lens before. Eager to share their epiphany, the Cabelleros set out to flesh out the SSP-DoD story by intensely researching military and dual-use energy applications for SSP. In addition to making large quantities of orbital power available for a long list of space applications, the most obvious use of SSP was for military base power. An average requirement of 5-15 MW of 24/7 baseload electricity could be delivered inside most base perimeters with a one km-wide or less rectenna—tremendously significant from a force-protection perspective for minimizing vulnerable external overland lines of fuel and power transportation. Supporting the individual soldier came next. Today the average GI on the ground consumes the equivalent of one AA battery per hour to power his suite of electronic gear. Add to this the proliferation of other remote sensor and electronic equipment. The logistic supply requirement of this reality is enormous and could be significantly reduced by delivering low-intensity, wide-area broadcast power over an entire area of operations. This same power could also be used to provide immediate relief in areas of humanitarian disaster or nation building. Finally, utilizing both decades-old chemistry and recently discovered technologies from U.S. national labs, SSP energy can be used as raw feedstock for the production of any carbon-neutral synthetic fuel ranging from basic hydrogen to long-chain hydrocarbon jet fuel. This is significant and potentially the most exciting of all applications because today the DoD is the largest single consumer of petroleum in the U.S.

### Successful transition saves the budget

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

A successful transition away from petroleum will produce financial, operational and strategic gains. Reducing dependence on petroleum will help ensure the long-term ability of the military to carry out its assigned missions — and help ensure the security of the nation. Though adopting nonpetroleum fuels will require an initial investment, it will likely be recouped in budget savings over the long term. Finally, moving beyond petroleum will allow DOD to lead in the development of innovative technologies that can benefit the nation more broadly, while signaling to the world that the United States has as innovative and adaptable force. This transition should not compromise readiness and, indeed, DOD must always put mission first. However, DOD need not choose between accomplishing its mission and minimizing the strategic risks, price fluctuations and negative environmental effects of petroleum consumption. By providing the private sector with stable market signals and incentives to invest in scaling up the fuels that meet its unique energy needs, DOD will never need to sacrifice performance or national security for energy security. Rather, reducing reliance on petroleum will only help the armed services to accomplish their missions in the years and decades to come.

### And the link only goes our way, we’ve passed peak oil which means prices only go up from here, try or die for the aff

Hodge 11\*Nick Hodge is editor of Energy and Capital an online journal specializing in investment analysis in the new energy economy [<http://www.energyandcapital.com/articles/2015-end-of-the-oil-age/1609>, July 1st 2011, “2015: End of the Oil Age”]

If you're insolent enough to seek the truth, you might just come out ahead in this mess. For years, global governments have built up a wall of deceit to shelter the public from the reality of the end of oil. And for years, scientists and institutions not beholden to shareholders or constituents have tried to sound the alarm with muted results. But several events in the past few months have proven the most powerful governments in the world have known about Peak Oil for years. They've been intentionally downplaying it. And they have no idea what to do about it... It's not alarmist to say or think the world is running out of oil. It's actually one of the most prudent things I can think of. **Behind the Lies** As recently as 2009, the United Kingdom's official [position](http://www.guardian.co.uk/environment/georgemonbiot/2011/jun/16/peak-oil-labour-government" \t "_blank) was that “global oil (and gas) reserves are sufficient to sustain economic growth for the foreseeable future”; also that existing policies put it “in a good position to deal with the longer-term challenge of declining oil reserves.” The government consistently cited the International Energy Agency's forecast that Peak Oil wouldn't occur until 2030, if at all. Now, after being repeatedly threatened under the Freedom of Information Act, the release of a years-old report shows the UK government *has* known about imminent Peak Oil and its consequences. We now know the Labour Government spent six months evaluating the likely impacts of Peak Oil back in 2007. (You can see that research in a [PowerPoint](http://www.decc.gov.uk/publications/basket.aspx?filetype=4&filepath=What+we+do%2fGlobal+climate+change+and+energy%2fInternational+energy%2fenergy+security%2f1790-decc-report-2009-oil-decline.pptx&minwidth=true" \l "basket" \t "_blank) recently released by the government.) As a result of that research, the government was warned of “significant negative economic consequences”, should Peak Oil occur in the short term. The report also noted it was impossible to forecast the exact moment when supply would peak — but there would be global consequences, including “civil unrest”, when it did. In a worst-case scenario, the peak would happen before 2015. The report's conclusion stated it is “clear” that: Existing fields are maturing; The rate of investment in new and existing production is being slowed down by bottlenecks, the economic downturn, and financial crisis; and Alternative technologies to oil will take a long time to develop and deploy at scale. Again, the UK government has had this report for years and has been denying its conclusions the entire time. **Coming to Jesus** Remember, UK officials were only echoing the International Energy Agency in saying Peak Oil could never happen before 2030. That would be fine — except for the fact the IEA changed its stance in late 2008. After conducting the first comprehensive study of the annual decline in output from the world's 800 largest oil fields, the IEA mentioned the word “peak” for the first time in its *[World Energy Outlook](http://www.worldenergyoutlook.org/2008.asp" \t "_blank)*. It also raised the annual decline rate from 3.7% to 6.7% — *almost double* the previous rate at which it said oil fields were depleting. After that report was published, IEA Chief Economist Fatih Birol had this to say: *In terms of non-OPEC, we are expecting that in three, four years' time the production of conventional oil will come to a plateau, and start to decline... In terms of the global picture, assuming that OPEC will invest in a timely manner, global conventional oil can still continue, but we still expect that it will come around 2020 to a plateau as well... I think time is not on our side here.* He must've been lying then, too — or at least severely distorting the truth. Because ol' Fatih dropped another bombshell two months ago during a television interview: *When we look at the oil markets the news is not very bright. We think that the crude oil production has already peaked in 2006.* *The existing fields are declining sharply in North sea, in United States, in Gulf of Mexico. Just to stay where we are today we have to find four new Saudi Arabia's, this is a tall order. (transcript [here](http://www.abc.net.au/catalyst/stories/3201781.htm" \t "_blank))* Yep. In late April, the head of the IEA said crude oil production peaked five years ago. No big deal — not newsworthy or anything. He said it on a Thursday and we killed bin Laden two days later, so the clip conveniently didn't make it into the news cycle... But you know it now. And you can use this truth for personal gain while the herd continues to obliviously graze. **Spreading the Word** So the IEA and the UK government are now out of the closet when it comes to Peak Oil. Anyone else want to step up and admit Peak Oil is real, and will happen sooner rather than later? I promise, the punishment will be less harsh if you confess now. There are a few brave souls... The UK Industry Taskforce on Peak Oil and Energy Security — composed of Yahoo!, Virgin, and others — [warned](http://www.guardian.co.uk/business/2009/nov/15/oil-industry-peak-oil-projections" \t "_blank) in a report last year that serious oil shortages could occur by 2015. The U.S. military has [warned](http://www.guardian.co.uk/business/2010/apr/11/peak-oil-production-supply" \t "_blank) surplus oil capacity could disappear within two years with serious shortages by 2015. Sweden (and Uppsala University physics professor Kjell Aleklett, in particular) still isn't satisfied with the IEA's partial admission of the peak. The Swedish Energy Agency funded its own Peak Oil research. After what he found, Aleklett calls the IEA's World Energy Outlook a “political document” meant only to aid geopolitics for oil-consuming countries with a vested interest in low prices. (He meant the United States, if you didn't discern that bit on your own.) According to Aleklett and his team, oil output in 2030 is likely to be closer to 75 million barrels per day instead of the IEA's more optimistic forecast of 105 mbd.

### And its try or die, disruptions in supply can happen at any time

Parthemore and Rogers 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Will Rogers is a research assistant at the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Sustaining%20Security_Parthemore%20Rogers.pdf>,June 2010, “Sustaining Security How Natural Resources Influence National Security”]

Recognition of the geostrategic, strategic and operational vulnerabilities associated with the current world energy system is growing. With world demand for high-carbon fuels growing and their effects on climate change better understood, the importance of moving away from a heavily fossil fuel-based energy economy is increasingly clear. At a geostrategic level, access to fossil fuels colors and determines U.S. relations with key supplier nations around the world, including Russia, Saudi Arabia and Iran, but also with major consumer nations such as China. At a strategic level, the DOD is already highly engaged in missions to protect U.S. and global access to world oil markets; the physical vulnerability of the global production and supply infrastructure and the chronic instability in key oil supplying nations also mean that the department could have to contend with a serious supply disruption at any time. At the operational level, reliance on oil is costly and constitutes a force protection challenge (supply convoys have been heavily targeted by fighters in Iraq and Afghanistan). The risks this system imposes on U.S. and global security are considered a top concern by many analysts

### Independently SPS is critical to overall military dominance

Ramos 0 \*Kim Ramos is a U.S. Air Force Major the paper is a thesis submitted for the AIR COMMAND AND STAFF COLL MAXWELL Air Force Base [“Solar Power Constellations: Implications for the United States Air Force,” April, <http://handle.dtic.mil/100.2/ADA394928>]

Solar power satellites may affect terrestrial Air Force operations. One terrestrial application for solar power satellites, or the technologies associated with them, involves unmanned aerial vehicles. Unmanned aerial vehicles are used during contingencies to supplement satellite and piloted (manned) aerial reconnaissance coverage. The unmanned aerial vehicle may be powered by a wireless power transmission, which would increase its endurance. In another area, one of the core competencies of the Air Force is agile combat support, which involves reducing the footprint of deployed forces. The use of solar power satellites to supply the power at deployed locations would reduce the logistics tail by eliminating generators and the support equipment and supplies associated with them. The third area concerns public law. Public law requires the Department of Defense to develop and encourage alternative sources of energy for installations. As an alternative to electricity generated from fossil fuels, solar power satellites fit the bill admirably. Terrestrially, solar power satellites or the technology associated with them enable long duration unmanned aerial vehicles, which receive power through wireless power transmissions, allow for logistical improvements, and assist the Air Force in complying with public law. **Unmanned Aerial Vehicles** Unmanned aerial vehicles help achieve information superiority. Both joint and Air Force service visions define information superiority as vital. *Joint Vision 2010* calls information superiority a technological innovation to enable dominant maneuver, precision engagement, focused logistics, and full-dimensional protection. It defines information superiority as “the capability to collect, process, and disseminate an uninterrupted flow of information while exploiting or denying an adversary’s ability to do the same.”3 *Global Engagement: A Vision for the 21st Century Air Force* expresses the Air Force’s vision for the future and defines its core competencies. One of the Air Force Core Competencies it describes is information superiority. It goes on to endorse the use of unmanned aerial vehicles to “explore their potential uses over a full range of combat missions ”4 to achieve information superiority. Supported by the highest levels of the Department of Defense, the use of unmanned aerial vehicles to achieve information superiority in regional conflicts is increasing. High altitude and long endurance vehicles are in development for monitoring the atmosphere, environmental impact studies, and more important to the Air Force, for communications relays, surveillance, and missile defense.5 Other military uses for such vehicles are reconnaissance, targeting, target designation, and battle damage assessment.6 One of the requirements for these vehicles is that they must have long endurance,7 which currently is not possible. Using a microwave beam for powered flight and to power on-board instrumentation increases the endurance of the vehicle. Theoretically, by powering the craft with a beam it would possess unlimited endurance.8 The power transmitted to the unmanned vehicle could come from a solar power satellite in space or from a ground station. These vehicles would be part of a war fighting commander-in-chief’s arsenal. Unmanned aerial vehicles with various detection modules would serve as near earth satellites for regional coverage of events. This is especially important in areas where satellites are not available for coverage, the revisit time of a satellite is too long, or due to limited assets, sharing of satellite time takes place. **Logistics** In addition to information superiority, one of the emerging operational concepts expressed in *Joint Vision 2010* is focused logistics. Focused logistics will be the fusion of information, logistics, and transportation technologies to provide rapid crises response, to track and shift assets even while enroute, and to deliver tailored logistics packages and sustainment directly at the strategic, and tactical level of operations.9 It goes on to say, that focused logistics will accomplish “lightened deployment loads” and “a smaller logistics footprint.”10 In addition to *Joint Vision 2010*, Air Force doctrine also describes logistics as an important part of agile combat support, one of its core competencies. One of the objectives of agile combat support is to “reduce the overall “footprint” of forward-deployed support elements.”11 Power relay satellites, a stepping stone to full solar power satellites, could supply power to deployed locations and be part of focused logistics and agile combat support. Part of the deployment planning process would be identifying the nearest power relay satellite, the coordinates for the reflecting dish, and the amount of power required by the site. The next step, after demonstrating sites powered by a relay satellite, would be employing solar power satellites instead of relaying electricity across the globe. Using power beamed from a relay station or a solar power satellite could eliminate the power generating part of a deployment and reduce airlift. Incorporating the rectenna or the receiving part of the beam into camouflage netting or into tent tarps creates no additional infrastructure. For example, a typical joint task force communications unit for a bare base deployment requires the generators in Table 1 to supply power for the communications equipment and site. According to the Computer Aided Load Manifest software, used by logistics planners, to bring the generators into theater requires one C-17 or two C-141s. A Kenney Battlelab initiative on replacing aerospace ground equipment recommended alternative sources of power for airfield operations. In the report, it states power producing equipment “is repeatedly singled-out through after action reports … as the number one airlift intensive requirement for Air Expeditionary Force deployment.”12 The report recommends adopting fuel cell technology to solve the problem, however, solar power satellites or power relay satellites are also viable options. In addition to reducing airlift, using power from a satellite would reduce the fuel required for generators, minimize hazardous emissions and waste, reduce heat signatures, and eliminate a plethora of support equipment, war readiness spares kits, tools, and spillage clean up kits.13

### Offense only goes our way, DOD fuel consumption will ONLY rise

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Department-wide and service-specific strategy documents have identified solutions to navigating in this new environment. The solutions have three general themes (described in Appendix B): ¡ Theme 1. Our forces must expand geographically and be more mobile and expeditionary so that they can be engaged in more theaters and prepared for expedient deployment anywhere in the world. ¡ Theme 2. We must transition from a reactive to a proactive force posture to deter enemy forces from organizing for and conducting potentially catastrophic attacks. ¡ Theme 3. We must be persistent in our presence, surveillance, assistance, and attack to defeat determined insurgents and halt the organization of new enemy forces. To carry out these activities, the U.S. military will have to be **even more energy intense**, locate in more regions of the world, employ new technologies, and manage a more complex logistics system. Considering the trend in operational fuel consumption and future capability needs, this “new” force employment construct will likely demand more energy/fuel in the deployed setting. Simply put, more miles will be traveled, both by combat units and the supply units that sustain them, which will result in increased energy consumption. Therefore, DoD must apply new energy technologies that address alternative supply sources and efficient consumption across all aspects of military operations.

### No turns-SPS invigorates the U.S. industrial base, the tech is here now and provides the military with infinite priceless energy

Smith, 7\*Colonel M.V. “Coyote” Smith, is a PhD student in the strategic studies program under Professor Colin Gray at the University of Reading in the UK and an expert on space power [“The Goal for 2050 and the Build Forward,” Aug. 7, Space Solar Power, <http://spacesolarpower.wordpress.com/2007/08/07/the-goal-for-2050/>]

To give you a basis for analysis, by 2050 the goal is to have forty or so concentrator-photovoltaic space-based solar power (SBSP) satellites in geostationary orbit, each broadcasting via microwave between 2-5 gigawatts of power to terrestrial electrical power grids, with 1-to-5 broadcast antennas that can beam power to as many locations. This must be done using a sound business case. John Mankins calculates that this can be achieved by keeping the costs of delivery and assembly on orbit below $3,500 per kilogram–keeping the cost to customers below $0.10 per kilowatt/hour. This will drive robotic assembly and tug systems to pull these enormous structures from low orbits to geostationary. On orbit fueling stations will be required. Paul Werbos believes the best way to do this is to get launch costs down below $200 per kilogram. But several other factors help make the business case. For example, if the price of other energy sources goes up it helps to close the business case for SBSP. Other factors include the efficiencies associated with solar collectors, energy conversion, antennas/rectennas, signal path loss, etc. Dennis Wingo and others have suggested that the first customers for space-based solar power will be international–in areas such as India and Japan where the price per kilowatt/hour is astronomical compared to the Americas or Europe. All of this goes into making the business case. There will also be times when space-based solar power becomes priceless. When the Tsunami crushed the Pacific rim, when Hurricane Katrina flattened America’s Gulf Coast, and when United Nations forces responded to the beleaguered Darfur region the value of simply broadcasting power immeidately to the relief efforts would have been priceless in assisting the salvation of countless lives and facilitated the more immediate recovery of these disaster torn regions. Keep in mind American and Allied forces operating inside Iraq. Convoying petroleum through the streets of Iraqi cities is a large source of casualties…and the electrical power plants that convert that petroleum into electricity are under frequent attack…and the lights go out…and the people aren’t happy. As I’ve mentioned before, one of our defense analysts calculated that the U.S. is paying between $300-to-$800 per gallon for fuel delivered to the Iraqi electric plants. Mike Hornetschek reports that 70% of all logistics movements inside Iraq is petroleum. Inside Iraq, at this very moment–where people are dying–a supply of space-based solar power would have that priceless quality. And this is true wherever military forces and others are engaged not only in combat, but in nation building, humanitarian relief, disaster response, etc, etc, etc. The question was posed to me today, “What does the military need.” Here goes: According to Mike Hornitschek, a military base inside the United States consumes approximately 10 megawatts of electrical power. Forward military base overseas are consuming approximately 5 megaWatts of electrical power. I need space-based solar power satellites of the 5 megawatt class. Let’s say by 2015. This capability will transform our logistics and reduce our vulnerabilities. The development of this class of space-based solar power satellite is designed to deliver that priceless quality of energy. Best of all, it can be done with current technology using current spacelift vehicles**.** Think about that. But most important of all, developing the 5 megawatt class of satellite gets the ball rolling towards the 2050 vision that started this discussion. We WILL learn a great deal and we WILL find new efficiencies. We may make huge adjustments in the trade spaces as detailed in a previous discusion, and must be prepared to do so. In pressing ahead to field a 5 megawatt system, we will also be building the space industrial base and developing the rquisite spacefaring infrastructure to make the business case for the 2050 vision all the more viable. There will likely be cities or regional utilities that will want to buy their own 5 megawatt satellite (or larger) as a backup, which will help the business case even more and give us a better look at problems that lie waiting for us as we build bigger systems.

### Heg prevents nuclear wars across the globe

Kagan 7 **–** senior associate, Carnegie Endowment for International Peace (Robert, July, End of Dreams, Return of History,

http://www.realclearpolitics.com/articles/2007/07/end\_of\_dreams\_return\_of\_histor.html, AG/JMP)

Were the United States to diminish its influence in the regions where it is currently the strongest power, the other nations would settle disputes as great and lesser powers have done in the past: sometimes through diplomacy and accommodation but often through confrontation and wars of varying scope, intensity, and destructiveness. One novel aspect of such a multipolar world is that most of these powers would possess nuclear weapons. That could make wars between them less likely, or it could simply make them more catastrophic. It is easy but also dangerous to underestimate the role the United States plays in providing a measure of stability in the world even as it also disrupts stability. For instance, the United States is the dominant naval power everywhere, such that other nations cannot compete with it even in their home waters. They either happily or grudgingly allow the United States Navy to be the guarantor of international waterways and trade routes, of international access to markets and raw materials such as oil. Even when the United States engages in a war, it is able to play its role as guardian of the waterways. In a more genuinely multipolar world, however, it would not. Nations would compete for naval dominance at least in their own regions and possibly beyond. Conflict between nations would involve struggles on the oceans as well as on land. Armed embargos, of the kind used in World War i and other major conflicts, would disrupt trade flows in a way that is now impossible. Such order as exists in the world rests not merely on the goodwill of peoples but on a foundation provided by American power. Even the European Union, that great geopolitical miracle, owes its founding to American power, for without it the European nations after World War ii would never have felt secure enough to reintegrate Germany. Most Europeans recoil at the thought, but even today Europe 's stability depends on the guarantee, however distant and one hopes unnecessary, that the United States could step in to check any dangerous development on the continent. In a genuinely multipolar world, that would not be possible without renewing the danger of world war. People who believe greater equality among nations would be preferable to the present American predominance often succumb to a basic logical fallacy. They believe the order the world enjoys today exists independently of American power. They imagine that in a world where American power was diminished, the aspects of international order that they like would remain in place. But that 's not the way it works. International order does not rest on ideas and institutions. It is shaped by configurations of power. The international order we know today reflects the distribution of power in the world since World War ii, and especially since the end of the Cold War. A different configuration of power, a multipolar world in which the poles were Russia, China, the United States, India, and Europe, would produce its own kind of order, with different rules and norms reflecting the interests of the powerful states that would have a hand in shaping it. Would that international order be an improvement? Perhaps for Beijing and Moscow it would. But it is doubtful that it would suit the tastes of enlightenment liberals in the United States and Europe. The current order, of course, is not only far from perfect but also offers no guarantee against major conflict among the world's great powers. Even under the umbrella of unipolarity, regional conflicts involving the large powers may erupt. War could erupt between China and Taiwan and draw in both the United States and Japan. War could erupt between Russia and Georgia, forcing the United States and its European allies to decide whether to intervene or suffer the consequences of a Russian victory. Conflict between India and Pakistan remains possible, as does conflict between Iran and Israel or other Middle Eastern states. These, too, could draw in other great powers, including the United States. Such conflicts may be unavoidable no matter what policies the United States pursues. But they are more likely to erupt if the United States weakens or withdraws from its positions of regional dominance. This is especially true in East Asia, where most nations agree that a reliable American power has a stabilizing and pacific effect on the region. That is certainly the view of most of China 's neighbors. But even China, which seeks gradually to supplant the United States as the dominant power in the region, faces the dilemma that an American withdrawal could unleash an ambitious, independent, nationalist Japan. In Europe, too, the departure of the United States from the scene -- even if it remained the world's most powerful nation -- could be destabilizing. It could tempt Russia to an even more overbearing and potentially forceful approach to unruly nations on its periphery. Although some realist theorists seem to imagine that the disappearance of the Soviet Union put an end to the possibility of confrontation between Russia and the West, and therefore to the need for a permanent American role in Europe, history suggests that conflicts in Europe involving Russia are possible even without Soviet communism. If the United States withdrew from Europe -- if it adopted what some call a strategy of "offshore balancing" -- this could in time increase the likelihood of conflict involving Russiaand its near neighbors, which could in turn draw the United States back in under unfavorable circumstances. It is also optimistic to imagine that a retrenchment of the American position in the Middle East and the assumption of a more passive, "offshore" role would lead to greater stability there. The vital interest the United States has in access to oil and the role it plays in keeping access open to other nations in Europe and Asia make it unlikely that American leaders could or would stand back and hope for the best while the powers in the region battle it out. Nor would a more "even-handed" policy toward Israel, which some see as the magic key to unlocking peace, stability, and comity in the Middle East, obviate the need to come to Israel 's aid if its security became threatened. That commitment, paired with the American commitment to protect strategic oil supplies for most of the world, practically ensures a heavy American military presence in the region, both on the seas and on the ground. The subtraction of American power from any region would not end conflict but would simply change the equation. In the Middle East, competition for influence among powers both inside and outside the region has raged for at least two centuries. The rise of Islamic fundamentalism doesn 't change this. It only adds a new and more threatening dimension to the competition, which neither a sudden end to the conflict between Israel and the Palestinians nor an immediate American withdrawal from Iraq would change. The alternative to American predominance in the region is not balance and peace. It is further competition. The region and the states within it remain relatively weak. A diminution of American influence would not be followed by a diminution of other external influences. One could expect deeper involvement by both China and Russia, if only to secure their interests. 18 And one could also expect the more powerful states of the region, particularly Iran, to expand and fill the vacuum. It is doubtful that any American administration would voluntarily take actions that could shift the balance of power in the Middle East further toward Russia, China, or Iran. The world hasn 't changed that much. An American withdrawal from Iraq will not return things to "normal" or to a new kind of stability in the region. It will produce a new instability, one likely to draw the United States back in again. The alternative to American regional predominance in the Middle East and elsewhere is not a new regional stability. In an era of burgeoning nationalism, the future is likely to be one of intensified competition among nations and nationalist movements

## \*\*\*India Advantage\*\*\*

### Advantage \_\_ - India

### The plan dramatically boosts US-Indian cooperation on SPS

NSSO 7 **–** report by the National Security Space Office, a branch of the DOD

(“Space-Based Solar Power As an Opportunity for Strategic Security,” <http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf>, dml)

The SBSP Study Group found that no outright policy or legal showstoppers exist to prevent the development of SBSP. Full‐scale SBSP, however, will require a permissive international regime, and construction of this new regime is in every way a challenge nearly equal to the construction of the satellite itself. The interim review did not uncover any hard show‐stoppers in the international legal or regulatory regime. Many nations are actively studying Space‐Based Solar Power. Canada, the UK, France, the European Space Agency, Japan, Russia, India, and China, as well as several equatorial nations have all expressed past or present interest in SBSP. International conferences such as the United Nations‐connected UNISPACE III are continually held on the subject and there is even a UN‐affiliated non‐governmental organization, the Sunsat Energy Council, that is dedicated to promoting the study and development of SBSP. The International Union of Radio Science (URSI) has published at least one document supporting the concept, and a study of the subject by the International Telecommunications Union (ITU) is presently ongoing. There seems to be significant global interest in promoting the **peaceful use of space**, sustainable development, and carbon neutral energy sources, indicating that perhaps an open avenue exists for the United States to **exercise “soft power**” via the development of SBSP. That there are no show‐stoppers should in no way imply that an adequate or supportive regime is in place. Such a regime must address liability, indemnity, licensing, tech transfer, frequency allocations, orbital slot assignment, assembly and parking orbits, and transit corridors. These will likely involve significant increases in Space Situational Awareness, data‐sharing, Space Traffic Control, and might include some significant similarities to the International Civil Aviation Organization’s (ICAO) role for facilitating safe international air travel. Very likely the construction of a truly adequate regime will take as long as the satellite technology development itself, and so consideration must be given to beginning work on the construction of such a framework immediately.

### And, India would be the frontrunner for partnership – that’s key to relations and further space cooperation – and only the plan solves

Dinerman 9 – regular contributor to the Space Review

(Taylor, “Should India and the US cooperate on space solar power?,” <http://www.thespacereview.com/article/1389/1>, dml)

If the US has a serious medium-term need for a very large new source of clean energy, India needs it even more. While there is a lot of talk about terrestrial solar, wind, and geothermal power as alternatives to coal—which seems to be currently politically unacceptable—or nuclear—which has its own set of political problems but whose greatest drawback may simply be the length of time it takes to build new power plants—space solar power (SSP) may be the only alternative that could be made to work before the major global electricity demand crisis hits, around the year 2050. In Washington lots of people have complained that the Obama Administration has so far not given the India-US relationship the attention it deserves. Others are waiting to see if this relatively new team is going to follow up on the progress made by both the Clinton and the George W. Bush Administrations in building a real friendship between the two democratic giants. The one area in which there seems to be movement on, though, is a “renewable energy partnership”. From India’s standpoint the government does take the energy problem very seriously. While they connect it with the question of climate change, they have made it clear that they are not willing to inflict economic pain on their people in order to appease those in the West who are demanding that they cease their current drive to climb out of mass poverty in the name of the environment. Former External Affairs Minister Pranab Mukherjee made this clear when he spoke at the Asia Society in New York last year and said, “It is therefore completely one sided to target countries like India, whose emissions though modest are rising, but fail to bring to account those who have been responsible for more than 70% of the accumulated emissions in the atmosphere.” Recognizing the potential weakness of a case based strictly on the question of climate change, Mukherjee was wise enough to add that “even if there were no climate change arguments, considerations of energy security alone would require a medium to long term strategy of implementing a strategic shift from fossil fuels to non fossil fuels.” He called for a “major R&D effort to develop applications that that can provide convenient, cost effective large scale applications of solar energy.” Any analysis of the potential of terrestrial solar energy in India or elsewhere runs up against the awesome size of the future demand for power. Photovoltaic panels on rooftops and solar water heaters all make excellent small-scale contributions to the solution, but they cannot by any stretch of the imagination fulfill the requirements of a huge growing economy like India’s. Only SSP, which operates 24 hours a day, 7 days a week, year after year, can hope to meet this need. Fortunately both India and the US have space programs and technologies that could, if developed together and possibly with other interested nations such as Japan, bring SSP systems into service sometime late next decade or the early 2020s. With its commitment to develop a new low cost reusable spaceplane, the India Space Research Organisation (ISRO) is already working on one of the key technologies needed for an SSP system. Indian participation in both private and public SSP programs should be welcomed by the US. Ehe US government should make an effort to facilitate this by helping with visas and work permits for qualified Indian scientists and engineers. Recent moves towards reforming the notorious International Traffic in Arms Regulations (ITAR) should include ensuring that SSP systems are covered by the Department of Commerce regulators rather than by the State Department, which has gained such a sorry reputation in this area. In the near term the new Indo-US renewable energy partnership would seem to be the right place to start this collaboration. Together the partners can identify what will be needed in the way of technological and scientific investments over the next decade in order to make SSP a reality. India has lots of talent that can be committed to this effort and so does the US. In fact, the kind of ambitious idealism that we saw at NASA during the Apollo years could be engendered by this goal. Safe, clean, abundant energy from the Sun is not an impossible dream. The technology has not been perfected and the need for new, low-cost Earth-to-orbit transportation systems is as urgent as ever, but there are no requirements for any scientific breakthroughs. The Space Solar Power Study released by the US National Security Space Office (NSSO) in October 2007 found that since the 1977 “Reference” study, there had been: (a) improvements in PV [photovoltaic] efficiency from about 10% (1970s) to more than 40% (2007); (b) increases in robotics capabilities from simple tele-operated manipulators in a few degrees of freedom (1970s) to fully autonomous robotics with insect-class intelligence and 30–100 degrees of freedom (2007); (c) increases in the efficiency of solid state devices from around 20% (1970s) to as much as 70%–90% (2007); (d) improvements in materials for structures from simple aluminum (1970s) to advanced composites including nanotechnology composites (2007) The 2007 NSSO study showed just how far the technology had come and why space solar power is now a more viable alternative for very large-scale power generation than ever before. India and the US are natural partners in the development of this technology and the opportunity provided by the planned renewable energy partnership is a perfect place to begin.

### Scenario 1: ASATs

### India’s space policy is at a watershed moment – cooperation with India allows us to define the partnership and prevent an arms buildup – treaties don’t solve

Johnson-Freese 11 – professor of national security affairs at the Naval War College

(Joan, “The US-India Space Partnership: Who Gets What?”, May 17, [http://www.worldpoliticsreview.com/articles/8839/the-u-s-India-space-partnership-who-gets-what?page=1](http://www.worldpoliticsreview.com/articles/8839/the-u-s-india-space-partnership-who-gets-what?page=1), dml)

India is adamant that it will not support any future treaties or mechanisms it sees as prejudicial. Given the political difficulties surrounding the U.S. and Russian ratifications of the New START Treaty, it seems unlikely that the United States will be inclined to sign any major treaties in the future. Indeed, treaties in general may soon fade as a remnant of a bygone era in arms control history. Nevertheless, both India and the U.S. recognize space as a global commons that must be protected, and there is common ground to be explored. Rule-making mechanisms must be developed and considered as an alternative to the re-emergence of the security dilemmas that came to dominate the Cold War world, and India must be persuaded to be part of these. The U.S. needs to be clear sooner rather than later in terms of what it will accept as the limits of its "full embrace" with India, and define the parameters of the coming partnership in space, if only to avoid misunderstandings and ill will on either or both sides later on.

### And, this is reverse causal – a failure to cooperate over space policies causes Indian ASAT development

Johnson-Freese 11 – professor of national security affairs at the Naval War College

(Joan,  “The US-India Space Partnership: Who Gets What?”, May 17, [http://www.worldpoliticsreview.com/articles/8839/the-u-s-India-space-partnership-who-gets-what?page=1](http://www.worldpoliticsreview.com/articles/8839/the-u-s-india-space-partnership-who-gets-what?page=1), dml)

The relationship between the United States and India was for many decades complicated by India's status as a "nonaligned" nation. The United States, inherently distrustful of neutrality during its Cold War struggle, was reticent to cooperate with nations who were also on good terms with the Soviet Union. However, the U.S.-India relationship has become increasingly close since 2001: The U.S. now views India as a rising democracy, a regional counter to China and an ally in the fight against radical Islamic fundamentalism. Ten days after the Sept. 11 attacks, Washington lifted sanctions put in place after India's 1998 nuclear tests. Since 2006, delegations from the American defense industry have flocked to India, which has budgeted $32 billion for defense procurement in 2010-2011, with $13 billion set aside solely for the acquisition of new weapons systems. In January 2011, the last of the export control restrictions on U.S. high-technology against both ISRO and DRDO were dropped as part of the U.S.-India strategic partnership. However, the question now is: How will India use all of the new military and space technology the U.S. has made available? Here is where there might be a future problem in the U.S.-India space partnership, as the Indian military has talked openly not just about anticipated military uses of space, but also about the weaponization of space -- that is, the actual use of arms in space, rather than the use of space to augment terrestrial military missions. Specifically, there has been discussion of ASAT weapons, a major sore point between the U.S. and China for some years now. How will these contradictory aspirations be reconciled in a peaceful partnership with the United States? In print and in person, Indian government and civilian analysts consistently offer three observations about India's space activities. First, the Indian space program has been and remains a civilian, peaceful program, and there has been no fundamental long-term change in Indian policy. It bears noting that New Delhi adopted this very same line about the Indian nuclear program for many years, up until India tested a nuclear weapon in 1974. Second, there is no competition among Asian countries in space. Third -- and what makes these two points difficult, if not impossible, to reconcile -- India needs a demonstrated ASAT capability, and it will achieve one via its Ballistic Missile Defense (BMD) program. In fact, in March 2011, India performed a test of the intercept missile portion of its BMD system, with some analysts feeling this was a de facto demonstration of ASAT capabilities, much as when the United States destroyed the malfunctioning US-193 satellite using BMD technology in 2008. The Indians do not seem to sense -- or at least, will not admit -- any contradictions among these three views. The mainstream Indian media report on the first two of these positions on a regular basis, while largely ignoring the third, as they willingly assist in championing India's space aspirations. Questions or concerns about India's intentions in space are rarely raised.

### That spurs Pakistani and Iranian ASATs development – causes space debris

Day 8 **–** program officer at the Space Studies Board of the National Research Council

(Dwayne, “Will we burn in heaven like we do down here?,” <http://www.thespacereview.com/article/1081/1>, dml)

Similarly, the Chinese and American actions may lead to an Indian military space program. Members of the Indian military have been unsuccessfully arguing for a military space program for some time now. But there are indications that the advocates are now gaining traction, in part because of comparisons to what happened to India in regards to the Nuclear Non-Proliferation Treaty, where India detonated a bomb after the treaty had been enacted, and earned the enmity of much of the world. Indian military space advocates can now argue that if there is going to be an “ASAT arms race” between the major powers, and if this eventually leads to some kind of negotiated constraints on space weapons, India should get into the game now, before any constraints are imposed, and thereby both secure its capability and a negotiating position. And of course if India does this, Pakistan will feel pressured to respond. Iran may also feel a need to develop a similar capability. Hitchens also said that there is a good chance that the weapons developed by these nations will have some very bad side effects. Kinetic vehicles—like the Chinese ASAT and the American SM-3 missile—are attractive to countries entering into the military space field “because you can see what you hit,” she said. There is no ambiguity when the tiny glowing dot suddenly blossoms into a spray of shiny particles. Those kinds of kinetic kill tests could then dramatically increase the space debris problem, and the threat to American satellites. So the United States’ actions are encouraging other countries to develop weapons and that may have negative effects for our own space capabilities.

### Space debris will destroy early warning satellites, resulting in an accidental global nuclear war

Lewis, 4– postdoctoral fellow in the Advanced Metods of Cooperative Study Program; worked in the office of the Undersecretary of Defense for Policy (Jeffrey, Center for Defense Information, “What if Space were Weaponized?” July 2004, <http://www.cdi.org/PDFs/scenarios.pdf>) // DCM

This is the second of two scenarios that consider how U.S. space weapons might create incentives for America’s opponents to behave in dangerous ways. The previous scenario looked at the systemic risk of accidents that could arise from keeping nuclear weapons on high alert to guard against a space weapons attack. This section focuses on the risk that a single accident in space, such as a piece of space debris striking a Russian early-warning satellite, might be the catalyst for an accidental nuclear war. As we have noted in an earlier section, the United States canceled its own ASAT program in the 1980s over concerns that the deployment of these weapons might be deeply destabiliz- ing. For all the talk about a “new relationship” between the United States and Russia, both sides retain thousands of nuclear forces on alert and conﬁgured to ﬁght a nuclear war. When briefed about the size and status of U.S. nuclear forces, President George W. Bush reportedly asked “What do we need all these weapons for?”43 The answer, as it was during the Cold War, is that the forces remain on alert to conduct a number of possible contingencies, including a nuclear strike against Russia. This fact, of course, is not lost on the Rus- sian leadership, which has been increasing its reliance on nuclear weapons to compensate for the country’s declining military might. In the mid-1990s, Russia dropped its pledge to refrain from the “ﬁrst use” of nuclear weapons and conducted a series of exercises in which Russian nuclear forces prepared to use nuclear weapons to repel a NATO invasion. In October 2003, Russian Defense Minister Sergei Ivanov reiter- ated that Moscow might use nuclear weapons “preemptively” in any number of contingencies, including a NATO attack.44 So, it remains business as usual with U.S. and Russian nuclear forces. And business as usual includes the occasional false alarm of a nuclear attack. There have been several of these incidents over the years. In September 1983, as a relatively new Soviet early-warning satellite moved into position to monitor U.S. missile ﬁelds in North Dakota, the sun lined up in just such a way as to fool the Russian satellite into reporting that half a dozen U.S. missiles had been launched at the Soviet Union. Perhaps mindful that a brand new satel- lite might malfunction, the ofﬁcer in charge of the command center that monitored data from the early-warning satellites refused to pass the alert to his superiors. He reportedly explained his caution by saying: “When people start a war, they don’t start it with only ﬁve missiles. You can do little damage with just ﬁve missiles.”45 In January 1995, Norwegian scientists launched a sounding rocket on a trajectory similar to one that a U.S. Trident missile might take if it were launched to blind Russian radars with a high altitude nuclear detonation. The incident was apparently serious enough that, the next day, Russian President Boris Yeltsin stated that he had activated his “nuclear football” – a device that allows the Russian president to communicate with his military advisors and review his options for launching his arsenal. In this case, the Russian early-warning satellites could clearly see that no attack was under way and the crisis passed without incident.46 In both cases, Russian observers were conﬁ-dent that what appeared to be a “small” attack was not a fragmentary picture of a much larger one. In the case of the Norwegian sounding rocket, space-based sensors played a crucial role in assuring the Russian leadership that it was not under attack. The Russian command sys-tem, however, is no longer able to provide such reliable, early warning. The dissolution of the Soviet Union cost Moscow several radar stations in newly independent states, creating “attack cor-ridors” through which Moscow could not see an attack launched by U.S. nuclear submarines.47 Further, Russia’s constellation of early-warn-ing satellites has been allowed to decline – only one or two of the six satellites remain operational, leaving Russia with early warning for only six hours a day. Russia is attempting to reconstitute its constellation of early-warning satellites, with several launches planned in the next few years. But Russia will still have limited warning and will depend heavily on its space-based systems to provide warning of an American attack.48 As the previous section explained, the Penta- gon is contemplating military missions in space that will improve U.S. ability to cripple Russian nuclear forces in a crisis before they can execute an attack on the United States. Anti-satellite weapons, in this scenario, would blind Russian reconnaissance and warning satellites and knock out communications satellites. Such strikes might be the prelude to a full-scale attack, or a limited ef- fort, as attempted in a war game at Schriever Air Force Base, to conduct “early deterrence strikes” to signal U.S. resolve and control escalation.49 By 2010, the United States may, in fact, have an arsenal of ASATs (perhaps even on orbit 24/7) ready to conduct these kinds of missions – to coerce opponents and, if necessary, support preemptive attacks. Moscow would certainly have to worry that these ASATs could be used in conjunction with other space-enabled systems – for example, long-range strike systems that could attack targets in less than 90 minutes – to disable Russia’s nuclear deterrent before the Rus- sian leadership understood what was going on. What would happen if a piece of space debris were to disable a Russian early-warning satel-lite under these conditions? Could the Russian military distinguish between an accident in space and the ﬁrst phase of a U.S. attack? Most Russian early-warning satellites are in elliptical Molniya orbits (a few are in GEO) and thus difﬁcult to attack from the ground or air. At a minimum, Moscow would probably have some tactical warn-ing of such a suspicious launch, but given the sorry state of Russia’s warning, optical imaging and signals intelligence satellites there is reason to ask the question. Further, the advent of U.S. on-orbit ASATs, as now envisioned50 could make both the more difﬁcult orbital plane and any warning systems moot. The unpleasant truth is that the Russians likely would have to make a judgment call. No state has the ability to deﬁnitively deter-mine the cause of the satellite’s failure. Even the United States does not maintain (nor is it likely to have in place by 2010) a sophisticated space surveillance system that would allow it to distin- guish between a satellite malfunction, a debris strike or a deliberate attack – and Russian space surveillance capabilities are much more limited by comparison. Even the risk assessments for col-lision with debris are speculative, particularly for the unique orbits in which Russian early-warning satellites operate. During peacetime, it is easy to imagine that the Russians would conclude that the loss of a satellite was either a malfunction or a debris strike. But how conﬁdent could U.S. planners be that the Russians would be so calm if the accident in space occurred in tandem with a second false alarm, or occurred during the middle of a crisis? What might happen if the debris strike oc-curred shortly after a false alarm showing a mis-sile launch? False alarms are appallingly common – according to information obtained under the Freedom of Information Act, the U.S.-Canadian North American Aerospace Defense Command (NORAD) experienced 1,172 “moderately seri-ous” false alarms between 1977 and 1983 – an average of almost three false alarms per week. Comparable information is not available about the Russian system, but there is no reason to believe that it is any more reliable.51 Assessing the likelihood of these sorts of co- incidences is difﬁcult because Russia has never provided data about the frequency or duration of false alarms; nor indicated how seriously early- warning data is taken by Russian leaders. More- over, there is no reliable estimate of the debris risk for Russian satellites in highly elliptical orbits.52 The important point, however, is that such a coincidence would only appear suspicious if the United States were in the business of disabling satellites – in other words, there is much less risk if Washington does not develop ASATs. The loss of an early-warning satellite could look rather ominous if it occurred during a pe- riod of major tension in the relationship. While NATO no longer sees Russia as much of a threat, the same cannot be said of the converse. Despite the warm talk, Russian leaders remain wary of NATO expansion, particularly the effect expan- sion may have on the Baltic port of Kaliningrad. Although part of Russia, Kaliningrad is separated from the rest of Russia by Lithuania and Poland. Russia has already complained about its decreas- ing lack of access to the port, particularly the uncooperative attitude of the Lithuanian govern- ment.53 News reports suggest that an edgy Russia may have moved tactical nuclear weapons into the enclave.54 If the Lithuanian government were to close access to Kaliningrad in a ﬁt of pique, this would trigger a major crisis between NATO and Russia. Under these circumstances, the loss of an early-warning satellite would be extremely suspi-cious. It is any military’s nature during a crisis to interpret events in their worst-case light. For ex- ample, consider the coincidences that occurred in early September 1956, during the extraordinarily tense period in international relations marked by the Suez Crisis and Hungarian uprising.55 On one evening the White House received messages indicating: 1. the Turkish Air Force had gone on alert in response to unidentiﬁed aircraft penetrat- ing its airspace; 2. one hundred Soviet MiG-15s were ﬂying over Syria; 3. a British Canberra bomber had been shot down over Syria, most likely by a MiG; and 4. The Russian ﬂeet was moving through the Dardanelles. Gen. Andrew Goodpaster was reported to have worried that the conﬂuence of events “might trigger off … the NATO operations plan” that called for a nuclear strike on the Soviet Union. Yet, all of these reports were false. The “jets” over Turkey were a ﬂock of swans; the Soviet MiGs over Syria were a smaller, routine escort returning the president from a state visit to Mos- cow; the bomber crashed due to mechanical difﬁculties; and the Soviet ﬂeet was beginning long-scheduled exercises. In an important sense, these were not “coincidences” but rather different manifestations of a common failure – human er- ror resulting from extreme tension of an interna- tional crisis. As one author noted, “The detection and misinterpretation of these events, against the context of world tensions from Hungary and Suez, was the ﬁrst major example of how the size and complexity of worldwide electronic warning systems could, at certain critical times, create momentum of its own.” Perhaps most worrisome, the United States might be blithely unaware of the degree to which the Russians were concerned about its actions and inadvertently escalate a crisis. During the early 1980s, the Soviet Union suffered a major “war scare” during which time its leadership concluded that bilateral relations were rapidly declining. This war scare was driven in part by the rhetoric of the Reagan administration, fortiﬁed by the selective reading of intelligence. During this period, NATO conducted a major command post exercise, Able Archer, that caused some elements of the Soviet military to raise their alert status. American ofﬁcials were stunned to learn, after the fact, that the Kremlin had been acutely nervous about an American ﬁrst strike during this period.56 All of these incidents have a common theme – that conﬁdence is often the difference between war and peace. In times of crisis, false alarms can have a momentum of their own. As in the second scenario in this monograph, the lesson is that commanders rely on the steady ﬂow of reli-able information. When that information ﬂow is disrupted – whether by a deliberate attack or an accident – conﬁdence collapses and the re- sult is panic and escalation. Introducing ASAT weapons into this mix is all the more dangerous, because such weapons target the elements of the command system that keep leaders aware, informed and in control. As a result, the mere presence of such weapons is corrosive to the conﬁdence that allows national nuclear forces to operate safely.

### ASATs also causes Indo-China conflict

Samson 10 **–** Washington director of the Secure World Foundation

(Victoria, “India’s missile defense/anti-satellite nexus,” <http://www.thespacereview.com/article/1621/1>, dml)

Part of why India may be interested in developing an ASAT capability is that it wishes to use it as a way to enhance its missile defense program and, to a lesser extent, its domestic science and technology skills. This is latter is seen even in the United States, which has a much longer history of space activities, where some of the strongest proponents for continuing with space exploration (for example) couch their arguments in the need to maintain and expand an intellectual industrial base for space technology know-how. An ASAT capability requires, if one is using kinetic kill vehicles and not relying on the destruction from an electromagnetic pulse or a nuclear-tipped warhead, very solid and reliable hit-to-kill capabilities. India has explicitly expressed its interest in developing more or less indigenously its own missile defense system and has been working assiduously on such a program for some time; thus, an ASAT program, as it were, would also be a technology demonstration program for a missile defense system. This highlights the similarities between missile defense and ASATs. Interestingly enough, India seemed a few years ago like it was more interested in purchasing parts of the Arrow Weapon System, a missile defense system co-developed by the United States and Israel. It apparently has since decided that it would rather build its own and gain the skill set such a system would require. But primarily, as can be seen by statements by Indian officials, not ceding ground to its political regional rival, China, is mostly grandstanding by India. The Indians see China as their main competitor and nation of concern (regarding space capabilities) in the region. So these statements by Indian officials partially can be explained as bombast to assure domestic audiences that India is a peer of China or even ahead of it. However, there is another explanation: these statements indicate that India is interested in being able to reach China. The Indians may have decided that they should be able to cover all contingencies for future conflicts. The Pakistanis are already well within range of Indian ballistic missiles, and by developing this long-range missile capability, the Indians will be able to counter China as well. They can point to the 2007 Chinese ASAT test as an example of the pressing need for reciprocal capability; again, this mirrors some of the debate within the United States for why American space assets may be endangered. And since China reportedly held its own hit-to-kill missile defense test in January 2010, this just adds more justification to those who feel that India must have a missile defense system in order to keep up with regional capabilities. There are lessons learned from previous arms control debates that have probably affected India’s decision to seek a missile defense/ASAT capability. One strong one is that Indians remember well that the 1968 Nuclear Non-Proliferation Treaty (NPT) made a concrete division between the nuclear haves and the have-nots. This partition was largely based on who had held a nuclear test prior to the treaty’s creation. India missed becoming an official nuclear weapon state by six years by having its first nuclear test—or, as India termed it, a “peaceful nuclear explosion”—in 1974. There are some within India who have taken that lesson to heart and want India to develop an ASAT capability so that India would be grandfathered in, should any future treaty or international agreement ban ASATs. This is probably to gain the prestige of being one of a select few states and the wish to avoid being hemmed in, should future Indian military officials decide that an ASAT capability is needed for their national security needs. India’s interest in developing this missile defense/ASAT capability also could be seen as an unintended consequence from the October 2008 US-India nuclear deal. In it, the United States agreed to lift its ban on nuclear trade with India, despite India’s not having signed the NPT and actively flouting the spirit of that treaty by holding nuclear weapon tests. The nuclear deal put India in a unique position relative to other non-conforming states to the NPT, thanks to its now special relationship with the United States; India may think that its benefactor will quietly look the other way while it develops ASATs. Furthermore, as noted earlier, many of India’s justifications for pursuing ASATs are quite familiar to those following the debate being held in the United States about how best to protect US space assets. Along those same lines, while there was much criticism of the debris created by China’s 2007 ASAT test, international approbation was about all that China was subjected to. There were not any military responses, economic embargoes, or even technological limitations (beyond what the export controls that the United States already had in place). Japanese Prime Minister Shinzo Abe very delicately called the test illegal with this statement to the Japanese Diet: “I believe it would not be in compliance with basic international rules such as the Outer Space Treaty.”15 (Article IX of the 1967 OST calls for prior international consultation if a state believes its planned space activities may be harmful to others.)16 So perhaps India figures that despite the unpopularity of developing ASATs, there are not going to be any tangible consequences to doing so. Now, if India were to actually test an ASAT, that might prove to be a different story, but as can be seen by the Indian officials quoted above, they probably realize that as well and have opted not to cross that line. Also, perhaps maintaining ambiguity around its ASAT plans serve India better than holding an actual test and removing all doubt as to whether it actually has that capability. Finally, it is important to put India’s missile defense/ASAT ambitions within the proper context. India does not have the indigenous space situational awareness capability needed for an ASAT system. India is working to improve this but, as the US missile defense systems’ trials and tribulations have shown, it is not something that can be developed rapidly, even if given great leeway in its development and a relatively blank check. While a dedicated satellite network is not a necessity, it does raise the question of how India intends to be able to detect and track missile launches. The United States’ experience in shooting down the de-orbiting satellite USA 193 in February 2008 with a modified Aegis Ballistic Missile Defense (BMD) interceptor demonstrated that missile defense radars often do not have the capacity to keep up with a satellite target, since the Aegis system’s radars were unable to track at the very fast speed that the satellite was travelling. Finally, while it is true that,*generally speaking*, a ballistic missile is expected to be able to reach an altitude of about half its range, this does not mean that this automatically translates into being able to reach that altitude while simultaneously serving as a missile defense interceptor. The Agni-III or -V may be powerful ballistic missiles, but they cannot be scaled down and just swapped into the Indian missile defense network in order to have a missile defense capacity; thus claims about their effectiveness equaling an enhanced ASAT or missile defense capability should be taken with a grain of salt. India’s ASAT plans are worrisome because in the Indians’ anxiety to keep up with China, they may unexpectedly create the exact thing that they are trying to avoid: a conflict in or about space. If their statements are misunderstood or if they ratchet up the rhetoric, they may thrust India into the position of having to hope that its missile defense interceptors do, indeed, serve as able ASATs.

### That causes miscalc and escalation to nuclear war – defense doesn’t apply

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(Manpreet Sethi, December 2009, NUCLEAR DETERRENCE IN SECOND TIER NUCLEAR WEAPON STATES: A CASE STUDY OF INDIA, <http://www.csh-delhi.com/publications/downloads/ops/OP25.pdf>)  
  
The first factor that is deemed to heighten nuclear dangers in the case of the two dyads under study is geographical proximity and a history of conflict. Located next to one another and sharing disputed boundaries, it is feared that any major breakout of conventional hostilities between India-Pakistan or India-China could increase the pressures for a pre-emptive strike or a nuclear attack being launched without proper confirmation. Moreover, since the missile flight times would only be between 8-13 minutes for missile ranges of 600-2000 kms, it would not allow either side to even use the hotline (assuming these were functional) to confirm the veracity (deliberate or accidental) or nature (conventional or nuclear) of launch. Haunted by the thought that the country that waited to use its nuclear assets might end up losing them to a disarming first strike would cause near immediate nuclear retaliation engulfing the nations in a mindless nuclear exchange.

### Scenario Two is Relations:

### Currently the US pursues a go-it-alone policy – that kills SBSP development – but cooperation brings momentum back to fading relations

[Garretson](http://www.idsa.in/sites/default/files/OP_SkysNoLimit.pdf) 10– Lt Col, on the Board of Directors of the National Space Society

(Peter, “Sky’s No Limit: Space-Based Solar Power, the Next Major Step in the Indo-US Strategic Partnership?,” <http://www.idsa.in/sites/default/files/OP_SkysNoLimit.pdf>, dml)

This researcher sees no reason to argue why the US or India or both together should not seek collaboration with these other partners, but there is significant momentum in the Indo-US strategic partnership, and strong reasons for the US to consider India. Firstly, India is the only major state where a Head of State has not only suggested space solar power as a goal for its space agency, but also expressed an interest in international cooperation. Second, as already noted above, there is considerable momentum in the Indo-US strategic partnership, with key components–space, energy, climate change, high tech, aviation, and dualuse strategic technologies and defence cooperation–already in place with vibrant dialogue. Third, India’s need for power and development is acute, likely considerably more acute than other potential partners which makes it potentially a more motivated partner, and a linked effort also promises a tremendous ultimate market potential. Fourthly, the success of space solar power will depend partly on low-cost manufacture. In the time frame when space solar power will come of age, perhaps 15 years in the future, even as other manufacturing and labour markets age and face decline, India is projected to be in the midst of its demographic dividend, with the largest working age population of any country on earth. 4 Finally, and significantly, in a breakthrough project like space solar power where an international regulatory framework is required, the influence of a historically normative power representing the developing world and its equities is a powerful enabler, and without such a partnership a go-it-alone attitude might find the environment and the markets considerably less permissive. Further, the case for technical cooperation with India is quite strong. As already remarked, over the course of nearly a decade, there has been significant momentum to the technical cooperation aspect of the Indo-US strategic partnership and we have finally put in place all the necessary precursor elements for institutional research and development. Cooperation today is principally at a low level because bureaucracies still are not familiar with each other, 5 and trust is earned incrementally over time. In the course of this research, there was no indication that there was reason to doubt that such trust and familiarity will be the natural course. India already contributes the largest number of foreign technical students in the US and its diaspora contributes substantially in high tech. As multinationals and successful Indian diaspora choose to return, India is likely to see a significant expansion in the number and type and competence of technical capabilities.

### Relations solve nuclear proliferation and nuclear terrorism

Asia Task Force 9– task force analyzing policy situations in Asia

(“Delivering on the Promise: Advancing US Relations with India, <http://asiasociety.org/files/pdf/DeliveryOnThePromise_USRelationsWithIndia.pdf>, dml)

With the achievement of the civil nuclear agreement with India, the responsibility grows even more salient to intensify our consultation with India on nonproliferation. We must first implement the present agreement, seeing that pending components which will allow the US private sector nuclear energy companies to participate in India move ahead. Second, we should continue working closely together to ensure the promise of civil nuclear trade. India has officially committed to Rajiv Gandhi’s idea of eliminating nuclear weapons. Practically, it knows this can only take place in stages. We should start from that premise and engage India in a dialogue, not most immediately about elimination, but about managing the dangers of our nuclear age. India remains concerned about the threat of unmitigated proliferation, the threat of nuclear weapons’ use, and the use of nuclear weapons for coercion. As part of India’s contribution, it has brought export controls in line with international standards, has indicated willingness to work toward a multilateral fissile material Cutoff treaty, and was a strong supporter of the international Convention on the suppression of Acts of Nuclear terrorism. We should develop our dialogue around (1) the safety and security of systems; (2) reducing alert; (3) identifying a careful approach to ending the nuclear age through reduction of weapons; and (4) treaties that will help end it. India is a state with advanced nuclear technology which it has stewarded responsibly, and thus has a stake in the nonproliferation system. Elsewhere in this report, we recommend India’s inclusion in important nonproliferation organizations as part of a deeper security engagement with India. Here, we recommend the inclusion of India in the 2010 NPT Review Conference. Of special note: The Obama Administration, with a Democratically-controlled Congress, will likely review its stance on the Comprehensive test Ban treaty. As the US review progresses, we must remain in the closest of touch with India, continuing honest dialogue, and continuing to encourage India to indefinitely maintain its current moratorium on testing.

### Nuclear terrorism causes extinction

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(Dennis, Futures, November, “World on fire: two scenarios of the destruction of human civilization and possible extinction of the human race,” Science Direct)

In a remarkable website on nuclear war, Carol Moore asks the question ‘‘Is Nuclear War Inevitable??’’ [10].4 In Section 1, Moore points out what most terrorists obviously already know about the nuclear tensions between powerful countries. No doubt, they’ve figured out that the best way to escalate these tensions into nuclear war is to set off a nuclear exchange. As Moore points out, all that militant terrorists would have to do is get their hands on one small nuclear bomb and explode it on either Moscow or Israel. Because of the Russian ‘‘dead hand’’ system, ‘‘where regional nuclear commanders would be given full powers should Moscow be destroyed,’’ it is likely that any attack would be blamed on the United States’’ [10]. Israeli leaders and Zionist supporters have, likewise, stated for years that if Israel were to suffer a nuclear attack, whether from terrorists or a nation state, it would retaliate with the suicidal ‘‘Samson option’’ against all major Muslim cities in the Middle East. Furthermore, the Israeli Samson option would also include attacks on Russia and even ‘‘anti-Semitic’’ European cities [10]. In that case, of course, Russia would retaliate, and the U.S. would then retaliate against Russia. China would probably be involved as well, as thousands, if not tens of thousands, of nuclear warheads, many of them much more powerful than those used at Hiroshima and Nagasaki, would rain upon most of the major cities in the Northern Hemisphere. Afterwards, for years to come, massive radioactive clouds would drift throughout the Earth in the nuclear fallout, bringing death or else radiation disease that would be genetically transmitted to future generations in a nuclear winter that could last as long as a 100 years, taking a savage toll upon the environment and fragile ecosphere as well. And what many people fail to realize is what a precarious, hair-trigger basis the nuclear web rests on. Any accident, mistaken communication, false signal or ‘‘lone wolf’ act of sabotage or treason could, in a matter of a few minutes, unleash the use of nuclear weapons, and once a weapon is used, then the likelihood of a rapid escalation of nuclear attacks is quite high while the likelihood of a limited nuclear war is actually less probable since each country would act under the ‘‘use them or lose them’’ strategy and psychology; restraint by one power would be interpreted as a weakness by the other, which could be exploited as a window of opportunity to ‘‘win’’ the war. In other words, once Pandora’s Box is opened, it will spread quickly, as it will be the signal for permission for anyone to use them. Moore compares swift nuclear escalation to a room full of people embarrassed to cough. Once one does, however, ‘‘everyone else feels free to do so. The bottom line is that as long as large nation states use internal and external war to keep their disparate factions glued together and to satisfy elites’ needs for power and plunder, these nations will attempt to obtain, keep, and inevitably use nuclear weapons. And as long as large nations oppress groups who seek self determination, some of those groups will look for any means to fight their oppressors’’ [10]. In other words, as long as war and aggression are backed up by the implicit threat of nuclear arms, it is only a matter of time before the escalation of violent conflict leads to the actual use of nuclear weapons, and once even just one is used, it is very likely that many, if not all, will be used, leading to horrific scenarios of global death and the destruction of much of human civilization while condemning a mutant human remnant, if there is such a remnant, to a life of unimaginable misery and suffering in a nuclear winter.

### Prolif causes extinction – this answers your rationality and escalation defense

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(Victor, Survival Vol 44 No 2 Proliferation, Missile Defence and American Ambitions, p. 87-90)

Many readers are probably wilting to accept that nuclear proliferation is such a grave threat to world peace that every effort should be made to avoid it. However, every effort has not been made in the past, and we are talking about much more substantial efforts now. For new and substantially more burdensome efforts to be made to slow or stop nuclear proliferation, it needs to be established that the highly proliferated nuclear world that would sooner or later evolve without such efforts is not going to be acceptable. And, for many reasons, it is not. First, the dynamics of getting to a highly proliferated world could be very dangerous. Proliferating states will feel great pressures to obtain nuclear weapons and delivery systems before any potential opponent does. Those who succeed in outracing an opponent may consider preemptive nuclear war before the opponent becomes capable of nuclear retaliation. Those who lag behind might try to preempt their opponent's nuclear programme or defeat the opponent using conventional forces. And those who feel threatened but are incapable of building nuclear weapons may still be able to join in this arms race by building other types of weapons of mass destruction, such as biological weapons. Second, as the world approaches complete proliferation, the hazards posed by nuclear weapons today will be magnified many times over. Fifty or more nations capable of launching nuclear weapons means that the risk of nuclear accidents that could cause serious damage not only to their own populations and environments, but those of others, is hugely increased. The chances of such weapons falling into the hands of renegade military units or terrorists is far greater, as is the number of nations carrying out hazardous manufacturing and storage activities. Increased prospects for the occasional nuclear shootout Worse still, in a highly proliferated world there would be more frequent opportunities for the use of nuclear weapons. And more frequent opportunities means shorter expected times between conflicts in which nuclear weapons get used, unless the probability of use at any opportunity is actually zero. To be sure, some theorists on nuclear deterrence appear to think that in airy confrontation between two states known to have reliable nuclear capabilities, the probability of nuclear weapons being used is zero." These theorists think that such states will be so fearful of escalation to nuclear war that they would always avoid or terminate confrontations between them, short of even conventional war. They believe this to be true even if the two states have different cultures or leaders with very eccentric personalities. History and human nature, however, suggest that they are almost surely wrong. History includes instances in which states known to possess nuclear weapons did engage in direct conventional conflict. China and Russia fought battles along their common border even after both had nuclear weapons. Moreover, logic suggests that if states with nuclear weapons always avoided conflict with one another, surely states without nuclear weapons would avoid conflict with states that had them. Again, history provides counter-examples. Egypt attacked Israel in 1973 even though it saw Israel as a nuclear power at the time. Argentina invaded the Falkland Islands and fought Britain's efforts to take them back, even though Britain had nuclear weapons. Those who claim that two states with reliable nuclear capabilities to devastate each other will not engage in conventional conflict risking nuclear war also assume that any leader from any culture would not choose suicide for his nation. But history provides unhappy examples of states whose leaders were ready to choose suicide for themselves and their fellow citizens. Hitler tried to impose a 'victory or destruction' policy on his people as Nazi Germany was going down to defeat.} And Japan's war minister, during debates on how to respond to the American atomic bombing, suggested 'Would it not be wondrous for the whole nation to be destroyed like a beautiful flower''- If leaders are willing to engage in conflict with nuclear-armed nations, use of nuclear weapons in any particular instance may not be likely, but its probability would still be dangerously significant. In particular, human nature suggests that the threat of retaliation with nuclear weapons is not a reliable guarantee against a disastrous first use of these weapons. While national leaders and their advisors everywhere are usually talented and experienced people, even their most important decisions cannot be counted on to be the product of well-informed and thorough assessments of all options from all relevant points of view. This is especially so when the stakes are so large as to defy assessment and there are substantial pressures to act quickly, as could be expected in intense and fast-moving crises between nuclear-armed states.' Instead, like other human beings, national leaders can be seduced by wishful thinking. They can misinterpret the words or actions of opposing leaders. Their advisors may produce answers that they think the leader wants to hear, or coalesce around what they know is an inferior decision because the group urgently needs the confidence or the sharing of responsibility that results from settling on something. Moreover, leaders may not recognise clearly where their personal or party interests diverge from those of their citizens. Under great stress, human beings can lose their ability to think carefully. They can refuse to believe that the worst could really happen, oversimplify the problem at hand, think in terms of simplistic analogies and play hunches. The intuitive rules for how individuals should respond to insults or signs of weakness in an opponent may too readily suggest a rash course of action. Anger, fear, greed, ambition and pride can all lead to bad decisions. The desire for a decisive solution to the problem at hand may lead to an unnecessarily extreme course of action. We can almost hear the kinds of words that could flow from discussions in nuclear crises or war. 'These people are not willing to die for this interest'. 'No sane person would actually use such weapons'. 'Perhaps the opponent will back down if we show him we mean business by demonstrating a willingness to use nuclear weapons'. 'If I don't hit them back really hard, I am going to be driven from office, if not killed'. Whether right or wrong, in the stressful atmosphere of a nuclear crisis or war, such words from others, or silently from within, might resonate too readily with a harried leader. Thus, both history and human nature suggest that nuclear deterrence can be expected to fail from time to time, and we are fortunate it has not happened yet. But the threat of nuclear war is not just a matter of a few weapons being used. It could get much worse. Once a conflict reaches the point where nuclear weapons are employed, the stresses felt by the leaderships would rise enormously. These stresses can be expected to further degrade their decision-making. The pressures to force the enemy to stop fighting or to surrender could argue for more forceful and decisive military action, which might be the right thing to do in the circumstances, but maybe not. And the horrors of the carnage already suffered may be seen as justification for visiting the most devastating punishment possible on the enemy.' Again, history demonstrates how intense conflict can lead the combatants to escalate violence to the maximum possible levels. In the Second World War, early promises not to bomb cities soon gave way to essentially indiscriminate bombing of civilians. The war between Iran and Iraq during the 1980's led to the use of chemical weapons on both sides and exchanges of missiles against each other's cities. And more recently, violence in the Middle East escalated in a few months from rocks and small arms to heavy weapons on one side, and from police actions to air strikes and armoured attacks on the other. Escalation of violence is also basic human nature. Once the violence starts, retaliatory exchanges of violent acts can escalate to levels unimagined by the participants beforehand.' Intense and blinding anger is a common response to fear or humiliation or abuse. And such anger can lead us to impose on our opponents whatever levels of violence are readily accessible. In sum, widespread proliferation is likely to lead to an occasional shoot-out with nuclear weapons, and that such shoot-outs will have a substantial probability of escalating to the maximum destruction possible with the weapons at hand. Unless nuclear proliferation is stopped, we are headed toward a world that will mirror the American Wild West of the late 1800s. With most, if not all, nations wearing nuclear 'six-shooters' on their hips, the world may even be a more polite place than it is today, but every once in a while we will all gather on a hill to bury the bodies of dead cities or even whole nations.

## \*\*\*Plan\*\*\*

### The United States Federal Government should develop and demonstrate space based solar power.

## \*\*\*Solvency\*\*\*

### A major government investment and demonstration ensure sustainable and environmentally friendly growth

-current technologies must be developed and demonstrated

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

Finding 1: Fundamentally new energy technologies clearly appear to be needed during the coming decades under all examined scenarios – both to support continued (and **sustainable) global economic growth**, and for reasons of **environmental/climate concerns**. Solar energy from space appears to be a **promising candidate** that can contribute to address these challenges. Finding 2: Solar Power Satellites appear to be technically feasible as soon as the coming 10-20 years using technologies existing now in the laboratory (at low- to moderate- TRL) that could be developed / demonstrated (depending on the systems concept details). • Finding 2a: There are several important technical challenges that must be resolved for each of the three SPS systems types examined by the IAA study. • Finding 2b: The mature (high-TRL) technologies and systems required to deploy economically viable SPS immediately do not currently exist; however, no fundamental breakthroughs appear necessary and the degree of difficulty in projected R&D appears tractable. • Finding 2c: Very low cost Earth to orbit transportation is a critically needed supporting infrastructure in which new technologies and systems must be developed to establish economic viability for commercial markets. Finding 3: Economically viable Solar Power Satellites appear achievable during the next 1-3 decades, but more information is needed concerning both the details of potential system costs and the details of markets to be served. • Finding 3a. SPS do appear economically viable under several different scenarios for future energy markets, including potential **government** **actions** to mediate environment/climate change issues. • Finding 3b. The economic viability of particular Solar Power Satellite concepts will depend upon both the markets to be served, and the successful development of the technologies to be used (including required levels of performance (i.e., key figures of merit for SPS systems). • Finding 3c: The potential economic viability of SPS has substantially improved during the past decade as a result of the emergence both of government incentives for green energy systems, and of “premium niche markets”. • Finding 3d. Establishing the economic viability of SPS will likely require a step-wise approach, rather than being achieving all at once – in particular SPS platform economics, space transportation economics, in-space operations economics, integration into energy markets, etc., will likely require iterative improvements to build confidence and secure funding for further developments. • Finding 3e. Given the economic uncertainties in developing and demonstrating SPS technologies and systems and the time required, it is **unlikely that private sector funding will proceed alone**; i.e., **government involvement and funding support is** likely **needed**. Finding 4: An in-depth end-to-end systems analysis of SSP/SPS is necessary to understand more fully the interactions among various systems / technologies for different concepts and markets; however, no such study has been performed since the conclusion of NASA’s Fresh Look Study in 1997. • Finding 4a: Scenario-based study approaches can be extremely useful in examining prospective markets for visionary future systems such as SPS, but must provide sufficient detail to enable one to distinguish from among various SPS systems options. • Finding 4b: Special attention appears needed to refresh understanding of prospects for space applications of SSP systems and technologies, with attention to the enabling role that low-cost electrical power in roughly the megawatt range could play for ambitious future space missions and markets. Finding 5: Low-cost Earth-to-orbit transportation is an enabling capability to the economic viability of space solar power for commercial baseload power markets. • Finding 5a: Extremely low cost ETO transportation systems appear to be technically feasible during the coming 20-30 years using technologies existing in the laboratory now (at low- to moderate- TRL) that could be developed / demonstrated (depending on the systems concept details). However, the technologies required for this future space capability are not sufficiently mature for system development to begin at present. • Finding 5b: Acceptable ETO systems for future SPS must be “environmentally benign” – i.e., space transportation infrastructures to launch the satellites cannot result in harmful pollution of the atmosphere. Finding 6: Systems studies are not enough. Technology Flight **Experiments** (TFEs) to test critical technology elements **and Technology** Flight **Demonstrations** (TFD) that validate SPS systems concepts to a high level of maturity (“TRL 7”) **appear to be essential** in order to build confidence among engineers, policy makers, and the public and allow space solar power technology maturation and SPS deployment to proceed. • Finding 6a: The International Space Station (ISS) appears to represent a highly attractive potential platform at which various SSP and related technology flight experiments (TFEs) could be performed. • Finding 6b: Free flying spacecraft appear to be an attractive option for selected SSP TFEs and systems level demonstrations. Finding 7: Architectural approaches that most efficiently and seamlessly integrate energy delivered from SPS into existing terrestrial energy networks are likely to be the most successful. (The same is true for any transformational new energy technology.) Finding 8: The SPS concept is sufficiently transformational and entails enough technical uncertainties such that major systems level in-space demonstrations will be necessary to establish technical feasibility, engineering characteristics and economical viability **before any organization is likely to proceed** **with full-scale development**. Finding 8a. The likely investment in technology maturation, hardware development and system deployment for a very low-cost, highly reusable space transportation (HRST) system will require some 10s of billions of dollars ($, US). If the SPS concept is the sole – or even a significant – market justification for such a development, then it is likely that a large-scale, pilot plant type **demonstration** of the SPS to be launched **will be required** prior to a government and/or commercial commitment to fielding HRST systems or supporting infrastructure. • Finding 8b. In-space systems and infrastructures that will support SPS deployment, assembly, servicing, etc. will be intimately related to the detailed designs and characteristics of the SPS platform, and to the design of supporting ETO systems (see Finding above). Such in-space systems will likely need to be developed and demonstrated in tandem with, if not prior to, the implementation of an SPS pilot plant demonstration. Finding 9: A variety of key policy-related and regulatory issues must be resolved before systems-level demonstrations – particularly space based tests – of SPS and WPT can be implemented. • Finding 9a. Spectrum management is an issue of particular importance that must be addressed early due to the time-consuming international processes that are in place vis-à-vis use of the electromagnetic spectrum and orbital slot allocations. • Finding 9b. A number of operational issues that are related to international cooperation and coordination, including WPT transmission safety requirements, orbital debris generation and management, etc., must also be addressed early. • Finding 9c. Policy related and regulatory issues will require considerable time to resolve, making the **need to begin** discussions **in a timely way very pressing,** particularly for SPS and related technology in-space tests and demonstrations.

### The plan significantly retires SSP risk – key to jump-starting private sector investment

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

The SBSP Study Group concludes that space‐based solar power does present a strategic opportunity that could significantly advance US and partner security, capability, and freedom of action and merits significant further attention on the part of both the US Government and the private sector. • The SBSP Study Group concludes that while significant technical challenges remain, Space‐ Based Solar Power is more technically executable than ever before and current technological vectors promise to further improve its viability. A **government‐led demonstration** of proof‐of‐ concept could serve to **catalyze commercial sector development**. • The SBSP Study Group concludes that SBSP requires a **coordinated national program** with **high‐ level leadership** and resourcing commensurate with its promise, but resourced at least on the level of fusion energy research or International Space Station construction and operations. • The SBSP Study Group concluded that should the U.S. begin a coordinated national program to develop SBSP, it should expect to find that broad interest in SBSP exists outside of the US Government, ranging from aerospace and energy industries; to foreign governments such as Japan, the EU, Canada, India, China, Russia, and others; to many individual citizens who are increasingly concerned about the preservation of energy security and environmental quality. While **the best chances for development are likely to occur with US Government support**, it is entirely possible that SBSP development may be independently pursued by other capable and ambitious nations or partnerships without U.S. leadership. • Certain key questions about Space‐Based Solar Power were not answerable with adequate precision within the time and resource limitations of this interim study, and form the agenda for future action. The fundamental tasks/questions are: o Identification of clear targets for economic viability in markets of interest o Identification of technical development goals and a roadmap for retiring risk o Selection of the best design trades o Full design and deployment of a meaningful demonstrator OVERARCHING RECOMMENDATIONS o Recommendation #1: The SBSP Study Group recommends that the U.S. Government should organize effectively to allow for the development of SBSP and conclude analyses to resolve remaining unknowns o Recommendation #2: The SBSP Study Group recommends that the U.S. Government should retire a major portion of the technical risk for business development to proceed o Recommendation #3: The SBSP Study Group recommends that the U.S. Government should create a facilitating policy, regulatory, and legal environment for the development of SBSP. Recommendation #4: The SBSP Study Group recommends that the U.S. Government should become an early demonstrator/adopter/customer of SBSP and incentivize its development.

### Only up-front government investment will promote large-scale development – otherwise most of the private sector will remain the sidelines

Komerath 10 – Professor of Aerospace Engineering

Narayanan, 1-4-2010, “The Space Power Grid: Synergy Between Space, Energy and Security Policies,” http://smartech.gatech.edu/bitstream/handle/1853/32263/217-673-1-PB.pdf.txt?sequence=3

At GEO, a satellite revolves around Earth?s axis once every 24 hours. Thus, it appears to be stationary above a point on Earth?s Equator. Concepts from the 1960s[1] called for very large solar-cell arrays to be built in GEO, beaming electric power down as microwaves to large receivers on Earth. Frequencies well below 10 billion cycles per second (10GHz) are generally not absorbed by the atmosphere whether dry or wet, and hence this regime was selected for power transmission. NASA and others have conducted numerous studies on SSP[2-5,10,11,12,13], but always focused on GEObased collector/converter/beaming systems. These choices have two consequences: 1) The cost of launching objects to GEO is on the order of $12000 to $24000 per kilogram. 2) The minimum diameter of the beam is on the order of several kilometers, for this frequency range and distance, regardless of the power transmitted. The result of the studies is always the same: it costs far too much to launch the solar cell arrays and converters to GEO, and to assemble the stations. If the number of ground stations is minimized, the distribution infrastructure becomes enormous. **Only massive government spending** can be visualized as a funding source, and even that is outside the realm of reality. The figure of $300B to first power is dangled in many reports. This was based on the estimate of $100 per pound to low earth orbit, used as advertisement for the Space Shuttle when it was sold to Congress in the 1970s. The reality today is over $14,000 per pound to Low Earth Orbit using the Shuttle, and more to GEO. For these reasons, SSP has remained a dream. We note that the real issue is lack of an evolutionary path to get the SSP system through **initial infrastructure development**, to a critical size where its true potential becomes self-sustaining.

### SSP skepticism only describes the status quo – the plan jump-starts investment that overcomes viability concerns

Hsu 10 – PhD in Engineering

Feng, PhD in Engineering, Former head of the NASA GSFC risk management function, and was the GSFC lead on the NASA-MIT joint project for risk-informed decision-making support on key NASA programs, has over 90 publications and is coauthor of two books and co-chair of several technical committees, 12-2010, “Harnessing the Sun: Embarking on Humanity's Next Giant Leap,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/hsu.html

Why solar energy from space? Is it technologically feasible? Is it commercially viable? My answer is **positively and absolutely yes**. One of the reasons that less than one percent of the world's energy currently comes from the sun is due to high photovoltaic cell costs and PV inefficiencies in converting sunlight into electricity. Based on existing technology, a field of solar panels the size of the state of Vermont will be needed to power the electricity needs of the whole U.S. And to satisfy world consumption will require some one percent of the land used for agriculture worldwide. Hopefully this will change when breakthroughs are made in conversion efficiency of PV cells and in the cost of producing them, along with more affordable and higher capacity batteries. Roughly 7 to 20 times less energy can be harvested per square meter on earth than in space, depending on location. Likely, this is a principal reason why Space Solar Power has been under consideration for over 40 years. Actually, as early as 1890, inventor of wireless communication Nikola Tesla wrote about the means for broadcasting electrical power without wires. Tesla later addressed the American Institute of Electrical Engineers to discuss his attempts to demonstrate long-distance wireless power transmission over the surface of the earth. He said, "Throughout space there is energy. If static, then our hopes are in vain; if kinetic - and this we know it is for certain - then it is a mere question of time when men will succeed in attaching their machinery to the very wheel work of nature."[4] Dr. Peter Glaser first developed the concept of continuous power generation from space in 1968[5]. His basic idea was that satellites in geosynchronous orbit would be used to collect energy from the sun. The solar energy would be converted to direct current by solar cells; the direct current would in turn be used to power microwave generators in the gigahertz frequency range. The generators feed a highly directive satellite-borne antenna, which beamed the energy to earth. On the ground, a rectifying antenna (rectenna) converted the microwave energy to direct current, which, after suitable processing, was to be fed into the terrestrial power grid. A typical Solar Power Satellite unit - with a solar panel area of about 10 square km, a transmitting antenna of about 2 km in diameter, and a rectenna about 4 km in diameter - could yield more than1 GW electric power, roughly equivalent to the productive capability of a large scale unit of a nuclear power station. Two critical aspects that have motivated research into SPS systems are: 1) the lack of attenuation of the solar flux by the earth's atmosphere, and 2) the twenty-four-hour availability of the energy, except around midnight during the predictable periods of equinox. The Technological and Commercial Viability of SPS Among the key technologies of Solar Power Satellites are microwave generation and transmission techniques, wave propagation, antennas and measurement calibration and wave control techniques. These radio science issues cover a broad range, including the technical aspects of microwave power generation and transmission, the effects on humans and potential interference with communications, remote sensing and radio-astronomy observations. Is SPS a viable option? Yes, in my opinion, it can and should be a major source of base-load electricity generation powering the needs of our future. SPS satisfies each of the key criteria except for cost based on current space launch and propulsion technology. We all know that the expense of lifting and maneuvering material into space orbit is a major issue for future energy production in space. The development of autonomous robotic technology for on-orbit assembly of large solar PV (or solar thermal) structures along with the needed system safety and reliability assurance for excessively large and complex orbital structures are also challenges. Nevertheless, **no breakthrough technologies or any theoretical obstacles need to be overcome** for a solar power satellite demonstration project to be carried out. Our society has repeatedly overlooked (or dismissed) the potential of space based solar power. The U.S. government funded an SPS study totaling about 20 million dollars in the late 1970s at the height of the early oil crisis, and then practically abandoned this project with nearly zero dollars spent up to the present day. A government funded SPS demonstration project **is overdue**. Ralph Nansen, a friend of mine, who was the former project manager of the Apollo program at Boeing and who later managed the DOE-NASA funded SSP proof of concept study in the late 1970s, detailed the Boeing study in his excellent 1995 book Sun Power: The Global Solution for the Coming Energy Crisis[6]. In 2009, he authored another book entitled Energy Crisis: Solution From Space[7]. I highly recommend the reading of each of these two books for those interested in this topic. Of course, Dr. Peter Glaser's 1968 book and other papers[8] are superb reading on this topic as well. What I really want to point out here is that we can solve the cost issue and make Solar Power Satellites a commercially viable energy option. We can do this through human creativity and innovation on both technological and economic fronts. Yes, current launch costs are critical constraints. However, in addition to continuing our quest for low cost RLV (reusable launch vehicle) technologies, there are business models for overcoming these issues.

# \*Aerospace Extensions

## Uniqueness – Space Leadership – Declining Now

### The U.S. leadership is falling—space development is uniquely important to revive our dominance

Gates 6-12

Dominic, Seattle Times aerospace reporter, “Boeing's Albaugh worries about 'intellectual disarmament' of U.S.”, The Seattle Times, http://seattletimes.nwsource.com/html/businesstechnology/2015304417\_albaughside13.html

Jim Albaugh is worried about the future of American technological supremacy in the world. "The biggest fear I have is what I call the **intellectual disarmament** of this country," said the Boeing Commercial Airplanes chief, who is also this year's chairman of the Aerospace Industries Association, the trade group for U.S. defense, space and aviation companies. "We still are the leader in aerospace," he added. "Are we going to be the leader in aerospace in another 20 years?" Albaugh is troubled that the nation's lead in aerospace, the fruit of Cold War military and space-race projects, will be allowed to **wither through lack of government funding of new challenges**. In a wide-ranging interview in advance of the global aviation gathering at the Paris Air Show, he ticked off a list of broad national problems that transcend Boeing: • Brain drain of talented immigrants: "The best and brightest used to come to the United States and stay," Albaugh said. "Now, the best and brightest come to the United States, get trained, and leave, and go back and compete against us." • Defense cuts: "There is no industrial base policy in the Department of Defense other than market forces," he said. "Right now, the Boeing Company is the only company in the United States that has a design team working on a new airplane. There are no [all-new] airplanes being developed for the Department of Defense probably for the first time in 100 years." • Competition from China: "The law of large numbers would dictate that they are going to have more smart people than we are going to have. And their government has identified aerospace as an industry that they've targeted," Albaugh said. "The question is, can they be innovative and can they handle the complex systems integration?" When Defense Secretary Robert Gates visited China in January, the Chinese military made a very public test flight of its previously secret J-20 Stealth fighter. "A lot of people saw that as a military threat," Albaugh said. "I didn't. I saw it more as an economic threat. They will sell that airplane around the world and will take away a lot of the market that's been enjoyed by U.S. defense contractors." • NASA cuts and private space ventures: "They are trying to commercialize space. ... Getting the reliability requires a lot of redundancy, which requires a lot of cost," Albaugh said. "I think it's going to be a money pit for a lot of them." He lamented the U.S. government's withdrawal from space exploration as the space-shuttle program winds down: "My prediction is that the Chinese will walk on the moon before we launch an American into orbit again in a U.S. spacecraft."

## Link – Reverse Causal

### The link is reverse causal – absent SPS investment the US aerospace goes out of business

Richardson 93 – Brigadier General, USAF

Robert Richardson, “Solar Power: The Next ‘Great Leap Forward’,”1993, The Journal of Social, Political and Economic Studies, Fall, p. 265-268

It is obvious that the sector of the U.S. economy that would most benefit from a major U.S. effort to harness solar power would be the Aerospace Industry. America's Aerospace Industry has been the principal driver of U.S. technological progress and worldwide technological leadership ever since WWII. The two arenas in which this has taken place are aeronautics and space activities. The time has now come for America to exploit this unique capability to collect and distribute the sun's energy and to reap the many benefits the U.S. could derive by doing this. Since the demise of the Cold War, U.S. technological leadership has become an increasingly important national security requirement. At times when major threats to national security are not obvious, a high level of technological progress provides the best assurance of being able to respond in timely fashion to new threats that may arise. The U.S. Aerospace Industry has been the sole source for much of this progress and cannot be safely disbanded despite the demise of the Soviet threat. The ability of governments to identify foreign technology breakthroughs in potentially threatening weapon systems also depends upon their ongoing level of research in the disciplines involved. Initial intelligence of foreign classified research efforts is invariably meager and ambiguous. When this intelligence first surfaces, only those having scientists and engineers working in the technologies concerned are likely to recognize what the potential opponent is up to and the threat it might pose. In addition to the importance of technological superiority to U.S. security, U.S. leadership in technology will be a major factor in maintaining America's economic health and a sound world trade position. Development of jet aircraft made the U.S. the leading supplier of commercial transports for a decade or more. The efforts to develop ICBM's, military space systems, and to put a man on the moon all generated large numbers of new commercial products, business opportunities, and income that contributed to our standard of living. Both U.S. technological leadership and the economic and security benefits this has brought the country are now in jeopardy. The reductions being made in defense and NASA budgets have all but eliminated major new technological initiatives, with remaining funds being diverted, of necessity, to keeping existing systems going. America's Aerospace Industry, which gave us successes like Apollo and the Space Shuttle, must now find a new "raison d'etre," or many of the companies it consists of will go out of business to the detriment of the U.S. ability to maintain an effective level of advanced research and development, let alone worldwide technological leadership. Most Aerospace corporations are now fighting one another while lobbying the government for the crumbs remaining on DOD's and NASA's table. There is no longer enough to go around and what is likely to remain available will only feed a small percentage of the efforts and capabilities that kept the U.S. a leader in advanced technology over the past few decades. One is reminded of sheep fighting each other over the few remaining clumps of grass on a range that is drying up and where only small local showers (government requirements) keep any of the formerly lush pasture alive. America's Aerospace Industry is slowly becoming an endangered species. Unfortunately, all too many people associate aerospace with the military and warfare and, being unaware of its economic and technological contributions, welcome this trend. The national interest clearly calls for a solution to this situation. The question is what it should or can be. Is there a viable, affordable, and politically salable solution? The answer is yes, provided it is undcrstood and pursued. A major U.S. program to develop solar energy sources would more than replace Aerospace job and income losses resulting from the demise of the cold war. It would also drive cutting-edge progress in almost all aspects of technology, thus insuring worldwide U.S. technological leadership, global markets, and readiness to respond to or deter almost any conceivable threats. And the cost of doing is not prohibitive, while the potential benefits to the V.S. and mankind as a whole are staggering. The logical solution is for the Aerospace Industry and its supporters to move to new, and potentially lush, pastures instead of fighting over what's left of the old ones. This could be a valid and acceptable solution, provided the new pasture is truly "new" - that is, that it is not already occupied by and supporting commercial activities that aerospace would be displacing or competing with. Fortunately, there is such an opportunity in exploiting advanced technology and space know-how to meet the world's growing need for energy. Not only is this a lush, new, nonmilitary, pasture, but one whose exploitation can address a multitude of world problems, including such apparently unrelated ones as growing third world population pressures and poverty. Doing this would also meet the Clinton Administration's desire to see industries and jobs, whose survival is threatened by either the U.S. deficit or terminations of the cold war, find work in the civil sector. The problem with converting defense and space industries into civil pursuits has been that other manufacturers are already providing for most existing civil market requirements. Aerospace conversion has also been limited by the fact that the characteristics of most Aerospace companies differ rather extensively from those of industry groups that provide primarily goods and services to the private sector. Most Aerospace companies have always been largely dependent on the government as their principal client. They are accustomed to working on million, if not billion, dollar, multi-year, contracts and their characteristics reflect this. This is especially true in such areas as: percentages of income derived from R&D versus production; numbers of scientists, engineers, and analysts vs. blue collar workers on their payrolls; and in marketing numbers, expertise, and procedures required to sell to private buyers as compared to government. Suffice it to say that the record of successful conversions from aerospace products to purely civil use products has, historically, not been good. Today there is a potential exception to this, and the time is ripe to introduce it. Not only is there a growing need to provide inexpensive and plentiful energy in order to raise the standard of living in the third world, and reduce population and "lebensraum" pressures, but the technology is ripe to do this in the relatively near term. This technology is wholly compatible with the experience and capabilities of the Aerospace Industry. The provision and distribution of unlimited, low cost, energy could be the new, high technology, pasture of the Aerospace corporations by the turn of the century. Success in pursuing this goal by U.S. corporations would not only meet the conversion aspirations of the President but also fit the characteristics of this specialized industry group. The economic potential and benefits to the nation, or nations, that do this are almost unlimited. And there is plenty of work to go around, and no need to fight over it. Shifting the primary role of most Aerospace corporations from weapon-system development to energy should be relatively simple. The customer to start with would obviously be the government - probably the Department of Energy (DOE) or NASA. The balance of basic and advanced research, development, and engineering people required should roughly equate to what these corporations now employ to meet U.S. defense and space programs, and the talents are similar. The management talent for multi-billion dollar, long lead-time, global-scale systems and efforts is similar to what they have been doing for the past twenty years or more. This job would clearly fit the Aerospace Industry's "pistol."

## Link – Space Leadership

### Plan boost space leadership

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:  The SBSP Study Group found that SBSP offers significant opportunities **for positive international leadership and partnership**, at once providing a positive agenda for energy, development, climate, and space. If the United States is interested in energy, sustainable development, climate change, and the peaceful use of space, the international community is **even hungrier** for solutions to these issues. While the US may be able to afford increased energy prices, the very availability and stability of energy is a threat to other countries’ internal stability and ability for development. SBSP offers a way to bypass much terrestrial electrical distribution infrastructure investment and to purchase energy from a reliable source at receiver stations that can be built by available domestic labor pools without significant adverse environmental effects, including greenhouse gas emissions.

## Impact – Space Assets – Economy

### Robust U.S. leadership is essential to protect and replace critical space assets – otherwise, short-term failure is likely due to accidents, attacks, or expiring life spans

AIAA 10

Aerospace Industries Association of America, “Aerospace and Defense: The Strength to Lift America”, April, http://www.nationalaerospaceweek.org/wp-content/uploads/2010/04/whitepaper.pdf

Space systems drive our nation’s competitiveness, economic growth and innovation. U.S. soldiers in the mountains of Afghanistan, farmers, bankers and emergency responders here at home all have a common reliance on a space infrastructure in orbit above the Earth. Everyday activities, taken for granted by many Americans, are supported or even driven by space systems. These systems are hidden to us and rarely noticed unless the services they provide are interrupted. However, the lack of visibility of space systems doesn’t diminish their importance — both our nation’s economy and national security are tied directly to this critical infrastructure. Communications drive today’s commerce, and space systems are a chief global conduit of our nation’s commercial and national security communications. The Internet, e-mail and wireless devices have all become the standard for businesses and recreation. Direct-to-home television and satellite radio have become standard in many American homes and automobiles. These all depend on our satellite communications systems. Similarly, the Global Positioning System, originally designed for military use, is now relied on for banking transactions, ATMs, improved agriculture, air traffic and ground transportation systems and by emergency responders. All of these applications add up to substantial economic activity. Of $214 billion in aerospace industry sales in 2007, direct space system industry sales topped $40 billion.14 Total direct and indirect global space activity for 2008 was $257 billion.15 Even harder to quantify — but no less valuable — is the impact that technology spinoffs from space activities bring to our economy. In 2009 alone, NASA entered into more than 250 agreements with private and other external entities for development of dual-use technologies.16 Space is certainly becoming more contested, congested and competitive. More than 60 nations are engaged in space efforts and tens of thousands of man-made objects orbit the Earth. In January 2007, the Chinese used a ballistic missile to destroy an aging weather satellite. This anti-satellite test demonstrated the very real ability of a foreign power to attack and destroy space assets and resulted in a dangerous debris cloud. In addition, the February 2009 collision of a commercial U.S. satellite and Russian satellite showed that space systems not only face disruption from intentional attack, but are also at risk from unintentional events in an increasingly crowded environment. Using systems developed by America’s aerospace industry, the Defense Department currently tracks more than 21,000 man-made objects in the Earth’s orbit — many of which could threaten civil and national security space systems, as well as our nation’s efforts to increase the commercial use of space.17 In such an environment, **investments** in rapid reconstitution, sensors, tracking, threat assessment and other space protection and situational awareness capabilities **are needed to mitigate the impacts** of an unexpected catastrophic space system failure. The cost and difficulty involved in developing and deploying space systems as well as the severe consequences of their loss necessitates that our nation’s space infrastructure be adequately protected. Part of ensuring robust space capabilities means that America must routinely replace and update its space infrastructure. It is highly problematic — if not infeasible — to perform maintenance or even refuel them. Space systems have limited life spans and, at today’s pace of technology, can quickly become obsolete. Critical space systems that provide missile warning, global communications, positioning, navigation and timing and weather are in need of upgrade at a time when other nations are rapidly modernizing their own space infrastructure. The **United States must remain a leader in human and robotic space** — a position that is perishable if not properly supported. Research aboard the International Space Station and human and robotic exploration beyond low Earth orbit must remain national priorities. These activities demonstrate global leadership, sharpen our expertise for future long-range space travel, add to our scientific knowledge and inspire our youth to pursue engineering and science disciplines. Space systems often go unnoticed in our daily lives, but their impact is very real. It is imperative that we as a nation have the right plans, strategies and budgets in place to keep our space industry competitive and our space systems, and their supporting Earth-based infrastructure, operating when we need them. It is increasingly important that the United States develop and maintain a cohesive national approach to our efforts in space — one that crosses civil agencies, the Defense Department and the intelligence community.

### Disruption of space assets shatters the global economy

Dillow 10 – Researcher @ PSM

Clay, Researcher – Popular Science Magazine, “Pentagon: A Space Junk Collision Could Set Off Catastrophic Chain Reaction, Disable Earth Communications”, Popsci, 5-27, [http://www.popsci.com/technology/ article/2010-05/dod-space-junk-tipping-point-collision-could-set-catastrophic-chain-reaction](http://www.popsci.com/technology/article/2010-05/dod-space-junk-tipping-point-collision-could-set-catastrophic-chain-reaction)

Our reliance on satellites goes beyond the obvious. We depend on them for television signals, the evening weather report, and to find our houses on Google Earth when we're bored at work. But behind the scenes, they also inform our warfighting capabilities, keep track of the global shipping networks that keep our economies humming, and help us get to the places we need to get to via GPS. According to the DoD's interim Space Posture Review, **that could all come crashing down.** Literally. Our satellites are sorely outnumbered by space debris, to the tune of 370,000 pieces of junk up there versus 1,100 satellites. That junk ranges from nuts and bolts lost during spacewalks to pieces of older satellites to whole satellites that no longer function, and it's all whipping around the Earth at a rate of about 4.8 miles per second. The fear is that with so much junk already up there, a collision is numerically probable at some point. Two large pieces of junk colliding could theoretically send thousands more potential satellite killers into orbit, and those could in turn collide with other pieces of junk or with satellites, unleashing another swarm of debris. You get the idea. To give an idea of how quickly **a chain reaction could get out hand** consider this: in February of last year a defunct Russian satellite collided with a communications satellite, turning 2 orbiting craft into 1,500 pieces of junk. The Chinese missile test that obliterated a satellite in 2007 spawned 100 times more than that, scattering 150,000 pieces of debris. If a chain reaction got out of control up there, it could very quickly sever our communications, our GPS system (upon which the U.S. military heavily relies), and **cripple the global economy** (not to mention destroy the $250 billion space services industry), and whole orbits could be rendered unusable, potentially making some places on Earth **technological dead zones**.

## Competitiveness – Uniqueness

### Competitiveness is collapsing now – new innovation is key

Dabney 10 – former bioscience communicator

Michael, former bioscience communicator at the University of California, San Diego, 4-2010, “U.S. Competitive Edge in Jeopardy,” The Epoch Times, Lexis

In his seminal 2002 best-seller “The Creative Class,” author Richard Florida had a thing or two to say about America’s diminishing leadership in innovation.

He wrote: “The United States appears to have thrown its gearshift into reverse. At all levels of government and even in the private sector, Americans have been cutting back crucial investments in creativity—in education, in research, in arts and culture—while pouring billions into low-return or no-return public projects like sports stadiums … If these trends continue, the U.S. may well squander its once-considerable lead.” It is America’s declining hegemony in high-tech innovation and research that has got decision makers in the U.S.—from the Oval Office and the National Science Foundation in Washington to researchers, business leaders, and educators across the country—concerned. “For more than half a century, the United States has led the world in scientific discovery and innovation. It has been a beacon, drawing the best scientists to its educational institutions, industries and laboratories from around the globe,” The Task Force on the Future of American Innovation wrote in the report “The Knowledge Economy: Is the United States Losing Its Competitive Edge?” “However, in today’s rapidly evolving competitive world, the United States can no longer take its supremacy for granted. Nations from Europe to Eastern Asia are on a fast track to pass the United States in scientific excellence and technological innovation,” the report said. Indeed, there are warnings on the horizon. Here are just some of them: Fewer graduates in science and engineering: America’s educational system was once at the forefront of producing the best scientists and engineers; but today, undergraduate science and engineering degrees in the United States are being awarded less frequently than in other countries. For example, according to the Council on Competitiveness, the ratio of first university degrees in natural sciences and engineering to the college-age population in the United States is only 5.7 degrees per 100. Some European countries, including Spain, Ireland, Sweden, the United Kingdom, France, and Finland, award between 8 and 13 degrees per 100. Japan awards 8 per 100, and Taiwan and South Korea each award about 11 per 100. Stagnant growth: Although the United States remains a competitive leader in innovation, it has made the least progress of all developing nations in competiveness and innovation capacity over the last decade, according to a 2009 report by the Information Technology and Innovation Foundation titled “The Atlantic Century: Benchmarking EU & U.S. Innovation and Competitiveness.” A fall from grace in key high-tech sectors: From 1998 to 2003, the balance of trade in the manufacture of aircraft—which for years was one of the strongest U.S. export sectors—fell from $39 billion to $24 billion, a loss of $15 billion, reflecting increased sales of foreign-made commercial aircraft to U.S. carriers. In areas of information technology, biotechnology, nanotechnology, and fusion energy science, the United States is also losing ground to Asia and some countries in the European Union (EU). “‘Can America compete?’ is the nation’s new No. 1 anxiety, the topic of emotional debate,” wrote Fortune magazine’s Geoffrey Colvin. “We’re not building human capital the way we used to. Our primary and secondary schools are falling behind the rest of the world’s. Our universities are still excellent, but the foreign students who come to them are increasingly taking their educations back home. As other nations multiply their science and engineering graduates—building the foundation for economic progress—ours are declining, in part because those fields are seen as nerdish and simply uncool.” To be sure, experts are quick to point out that despite these challenges, no one is saying that Americans can’t adapt and get back on track. The Task Force on the Future of American Innovation report stated: “The United States still leads the world in research and discovery, but our advantage is rapidly eroding, and our **global competitors may soon overtake us.**” To remain competitive in the global arena, the task force said, the United States must redirect its attention to the factors that have driven American innovation for years: research (especially that which is funded through federal and private entities for science and engineering), education, the technical workforce, and economic growth. Columbia University professor Dr. Jeffrey Sachs, cited in Colvin’s article, underscores this point. In a competitive global market, he said, it is science and technological breakthroughs that fundamentally influence economic development, and in an economy where technology leadership determines the winners, education trumps everything.

## Competitiveness – Unemployment Impacts – Growth

### Unemployment creates cycles of poverty that undermine any hope for long-term growth

Maloney 10 – Representative

Carolyn, “LONG-TERM UNEMPLOYMENT: CAUSES, CONSEQUENCES, AND SOLUTIONS,” Joint Economic Committee of Congress, http://www.gpo.gov/fdsys/pkg/CHRG-111shrg57058/pdf/CHRG-111shrg57058.pdf

The painful aftermath of long-term unemployment is borne by the unemployed, their families, and the economy as a whole. While the long-term unemployed earn 30 percent less in their new jobs than before they lost their jobs, even 15 to 20 years later these workers’ earnings are still about 20 percent less than similar workers who did not lose their jobs. The scarring effect of long-term unemployment also reaches into the next generation. The children of displaced workers have lower earnings and are more likely to be unemployed than those whose fathers had stable employment. Finally, the costs to the economy in terms of lost output are great, which will have an impact on our debt and deficit; $3.1 trillion of the deficit over the next 10 years can be attributed to the recession due to lost and lower incomes and the need for government assistance during periods of unemployment.

### It’s not just high-tech jobs – limiting unemployment creates a social infrastructure that is key to lifting the poorest of the poor

AFL-CIO 1

“An American Economy That Works for All Working Families,” http://www.aflcio.org/aboutus/thisistheaflcio/convention/2001/resolutions/upload/res6.pdf

Low unemployment rates also yield tremendous social benefits by providing a rung on the ladder of economic opportunity to those previously excluded from the labor force. Without the opportunity to earn a living and acquire job skills, it is impossible to participate in the American dream. Falling unemployment throughout the second half of the 1990s provided this opportunity to our most **economically disadvantaged citizens,** and the benefits were enormous for all of us. People everywhere worked when given the chance, welfare roles shrank and economically disadvantaged inner-city areas began to revive. Finally, low unemployment also produces major fiscal benefits. High levels of employment and rising wages increase tax revenues and reduce demand for social services. They also generate higher profits and stock market gains, which add to public revenues through corporate and capital gains taxes. As a result, the nation’s finances are improved, positioning us to invest in **education**, **public infrastructure, health care and retirement security**. In short, low unemployment is the **foundation of rising living standards**, greater productivity, **enhanced opportunities** for the most disadvantaged and sound public finances.

## Competitiveness – Unemployment Impacts – Protectionism

### High unemployment collapses US economic leadership

Altman 9 - Chair and CEO of Evercore Partners, U.S. Deputy Treasury Secretary in 1993-94.

Roger, Foreign Affairs, “Globalization in Retreat,” July/August, Academic Search Complete

Second, globalization is in retreat, both in concept and in practice. Much of the world now sees it as harmful. Those nations, especially developing ones, that embraced increased capital flows and open trade have been particularly injured. Those that insulated themselves, such as India, have been less scarred. The global spread of goods, capital, and jobs is reversing. Global exports are falling sharply. The World Bank reports that exports from China, Japan, Mexico, Russia, and the United States fell by 25 percent or more in the year leading up to February 2009. Capital flows are plunging, too. Emerging markets are projected to receive only $165 billion in net positive capital inflows this year, down from $461 billion in 2008. Furthermore, financial and trade protectionism are spreading. Both the World Bank and the World Trade Organization recently reported a movement toward higher tariffs, higher nontariff barriers, and an increase in antidumping actions, designed to protect domestic jobs. Brazil, India, Russia, and numerous other states were cited. Moreover, various states' fiscal stimulus plans include subsidies for exporters and "buy domestic" provisions. And discriminatory actions against foreign workers are spreading. Immigrant workers, who are particular victims of this crisis, are returning home in waves. Japan and Spain are offering them cash to leave, and Malaysia is forcing them out. Third, the world may be entering a new global phase marked by less leadership, less coordination, and less coherence. The world was already moving away from its post-Berlin Wall, unipolar condition, but this crisis has accelerated that process. The United States has turned inward, preoccupied with severe unemployment and fiscal pressures. Its economic model also is now out of favor. President Obama has made a triumphant overseas tour and is hugely popular everywhere. But his attention and political capital must be reserved for domestic issues, such as stabilizing the banking industry, handling the budget, and reforming health care. Other nations have been rising, especially China. Although the United States' capacity to lead is now diminished and will continue to be so over the medium term, none of these rising powers is capable of full leadership. The outlook for effective multilateral approaches is also cloudy. The G-7 and the G-20 are relatively ineffective, as evidenced by the recent London summit. Yes, the IMF was expanded there, and that is important, but on the more challenging issues--a coordinated global stimulus, global financial oversight, and Afghanistan--the summit failed. Fundamentally, the G-7 is an anachronism-- China is not a member--and the G-20 is too large. On urgent political matters, such as Iran and the Arab-Israeli conflict, multilateralism is in retreat. The economic crisis is requiring most nations, including the United States, to focus inward. Also, other nations' responsiveness to U.S. initiatives has been muted. The case of Pakistan makes that clear: a failed state with nuclear weapons would threaten many nations, and yet only U.S. diplomacy is fully active there. Fourth, this crisis likely will increase geopolitical instability. Dennis Blair, the U.S. director of national intelligence, has asserted that the downturn already has produced low-level instability in a quarter of the world. The IMF has warned that **millions will be pushed** into unemployment, poverty, rising social unrest, or even war.

### US economic model is the key internal link to interdependence and multilateral cooperation. The alternative is competitive mercantilism that will destroy cooperation

Posen 9 - deputy director and senior fellow of the Peterson Institute for International Economics

Adam, “Economic leadership beyond the crisis,” http://clients.squareeye.com/uploads/foresight/documents/PN%20USA\_FINAL\_LR\_1.pdf

In the postwar period, US power and prestige, beyond the nation’s military might, have been based largely on American relative economic size and success. These facts enabled the US to promote economic openness and buy-in to a set of economic institutions, formal and informal, that resulted in increasing international economic integration. With the exception of the immediate post-Bretton Woods oil-shock period (1974-85), this combination produced generally growing prosperity at home and abroad, and underpinned the idea that there were benefits to other countries of following the American model and playing by American rules. Initially this system was most influential and successful in those countries in tight military alliance with the US, such as Canada, West Germany, Japan, South Korea, and the United Kingdom. With the collapse of Soviet communism in 1989, and the concomitant switch of important emerging economies, notably Brazil, China, India, and Mexico, to increasingly free-market capitalism, global integration on American terms through American leadership has been increasingly dominant for the last two decades. The global financial crisis of 2008-09, however, represents a challenge to that world order. While overt financial panic has been averted, and most economic forecasts are for recovery to begin in the US and the major emerging markets well before end of 2009 (a belief I share), there remain significant risks for the US and its leadership. The global financial system, including but not limited to US-based entities, has not yet been sustainably reformed. In fact, financial stability will come under strain again when the current government financial guarantees and public ownership of financial firms and assets are unwound over the next couple of years. The growth rate of the US economy and the ability of the US government to finance responses to future crises, both military and economic, will be meaningfully curtailed for several years to come. Furthermore, the crisis will accelerate at least temporarily two related long-term trends eroding the viability of the current international economic arrangements. First, perhaps inevitably, the economic size and importance of China, India, Brazil, and other emerging markets (including oil-exporters like Russia) has been catching up with the US, and even more so with demographically and productivity challenged Europe and northeast Asia. Second, pressure has been building over the past fifteen years or so of these developing countries’ economic rise to give their governments more voice and weight in international economic decision-making. Again, this implies a transfer of relative voting share from the US, but an even greater one from overrepresented Western Europe. The near certainty that Brazil, China, and India, are to be less harmed in real economic terms by the current crisis than either the US or most other advanced economies will only emphasise their growing strength, and their ability to claim a role in leadership. The need for capital transfers from China and oil-exporters to fund deficits and bank recapitalisation throughout the West, not just in the US, increases these rising countries’ leverage and legitimacy in international economic discussions. One aspect of this particular crisis is that American economic policymakers, both Democratic and Republican, became increasingly infatuated with financial services and innovation beginning in the mid-1990s. This reflected a number of factors, some ideological, some institutional, and some interest group driven. The key point here is that export of financial services and promotion of financial liberalisation on the US securitised model abroad came to dominate the US international economic policy agenda, and thus that of the IMF, the OECD, and the G8 as well. This came to be embodied by American multinational commercial and investment banks, in perception and in practice. That particular version of the American economic model has been widely discredited, because of the crisis’ apparent origins in US lax regulation and over-consumption, as well as in excessive faith in American-style financial markets. Thus, American global economic leadership has been eroded over the long-term by the rise of major emerging market economies, disrupted in the shortterm by the nature and scope of the financial crisis, and partially discredited by the excessive reliance upon and overselling of US-led financial capitalism. This crisis therefore presents the possibility of the US model for economic development being displaced, not only deservedly tarnished, and the US having limited resources in the near-term to try to respond to that challenge. Additionally, the US’ traditional allies and co-capitalists in Western Europe and Northeast Asia have been at least as damaged economically by the crisis (though less damaged reputationally). Is there an alternative economic model? The preceding description would seem to confirm the rise of the Rest over the West. That would be premature. The empirical record is that economic recovery from financial crises, while painful, is doable even by the poorest countries, and in advanced countries rarely leads to significant political dislocation. Even large fiscal debt burdens can be reined in over a few years where political will and institutions allow, and the US has historically fit in that category. A few years of slower growth will be costly, but also may put the US back on a sustainable growth path in terms of savings versus consumption. Though the relative rise of the major emerging markets will be accelerated by the crisis, that acceleration will be insufficient to rapidly close the gap with the US in size, let alone in technology and well-being. None of those countries, except perhaps for China, can think in terms of rivaling the US in all the aspects of national power. These would include: a large, dynamic and open economy; favorable demographic dynamics; monetary stability and a currency with a global role; an ability to project hard power abroad; and an attractive economic model to export for wide emulation. This last point is key. In the area of alternative economic models, one cannot beat something with nothing – communism fell not just because of its internal contradictions, or the costly military build-up, but because capitalism presented a clearly superior alternative. The Chinese model is in part the American capitalist (albeit not high church financial liberalisation) model, and is in part mercantilism. There has been concern that some developing or small countries could take the lesson from China that building up lots of hard currency reserves through undervaluation and export orientation is smart. That would erode globalisation, and lead to greater conflict with and criticism of the US-led system. While in the abstract that is a concern, most emerging markets – and notably Brazil, India, Mexico, South Africa, and South Korea – are not pursuing that extreme line. The recent victory of the incumbent Congress Party in India is one indication, and the statements about openness of Brazilian President Lula is another. Mexico’s continued orientation towards NAFTA while seeking other investment flows (outside petroleum sector, admittedly) to and from abroad is a particularly brave example. Germany’s and Japan’s obvious crisis-prompted difficulties emerging from their very high export dependence, despite their being wealthy, serve as cautionary examples on the other side. So unlike in the1970s, the last time that the US economic performance and leadership were seriously compromised, we will not see leading developing economies like Brazil and India going down the import substitution or other self-destructive and uncooperative paths. If this assessment is correct, the policy challenge is to deal with relative US economic decline, but not outright hostility to the US model or displacement of the current international economic system. That is reassuring, for it leaves us in the realm of normal economic diplomacy, perhaps to be pursued more multilaterally and less high-handedly than the US has done over the past 20 years. It also suggests that adjustment of current international economic institutions is all that is required, rather than desperately defending economic globalisation itself. For all of that reassurance, however, the need to get buy-in from the rising new players to the current system is more pressing on the economic front than it ever has been before. Due to the crisis, the ability of the US and the other advanced industrial democracies to put up money and markets for rewards and side-payments to those new players is also more limited than it has been in the past, and will remain so for at least the next few years. The need for the US to avoid excessive domestic self-absorption is a real concern as well, given the combination of foreign policy fatigue from the Bush foreign policy agenda and economic insecurity from the financial crisis. Managing the post-crisis global economy Thus, the US faces a challenging but not truly threatening global economic situation as a result of the crisis and longer-term financial trends. Failure to act affirmatively to manage the situation, however, bears two significant and related risks: first, that China and perhaps some other rising economic powers will opportunistically divert countries in US-oriented integrated relationships to their economic sphere(s); second, that a leadership vacuum will arise in international financial affairs and in multilateral trade efforts, which will over time erode support for a globally integrated economy. Both of these risks if realised would diminish US foreign policy influence, make the economic system less resilient in response to future shocks (to every country’s detriment), reduce economic growth and thus the rate of reduction in global poverty, and conflict with other foreign policy goals like controlling climate change or managing migration and demographic shifts. If the US is to rise to the challenge, it should concentrate on the following priority measures.

### Economic nationalism will collapse growth and prompt global war

Garten 9 – professor at the Yale School of Management

Jeffrey, “The Dangers of Turning Inward”, 3/5, Wall Street Journal, http://www.business.illinois.edu/aguilera/Teaching/WSJ09\_Dangers\_of\_Turning\_Inward.pdf

The last time we saw sustained economic nationalism was in the 1930s, when capital flows and trade among countries collapsed, and every country went its own way. World growth went into a ditch, political ties among nations deteriorated, nationalism and populism combined to create fascist governments in Europe and Asia, and a world war took place. It took at least a generation for globalization to get back on track. There have been some bouts of inward- looking governmental action since then, such as the early 1970s when the U.S. cut the dollar from its gold base and imposed export embargoes on soybeans and steel scrap. However, the economic conditions were not sufficiently bad for the trend to sustain itself. The kind of economic nationalism we are seeing today is not yet extreme. It is also understandable. The political pressures could hardly be worse. Over the last decade, the global economy grew on average about 4% to 5%, and this year it will come to a grinding halt: 0.5% according to the International Monetary Fund, where projections usually err on the optimistic side. World trade, which has grown much faster than global gross domestic product for many years, is projected to decline this year for the first time since 1982. Foreign direct investment last year slumped by 10% from 2007. Most dramatically, capital flows into emerging market nations are projected to drop this year by nearly 80% compared to 2007. The aggregate figures don't tell the story of what is unraveling in individual countries. In the last quarter of 2008, U.S. GDP dropped by 6.2% at an annual rate, the U.K. by 5.9%, Germany by 8.2%, Japan by 12.7% and South Korea by 20.8%. Mexico, Thailand and Singapore and most of Eastern Europe are also in deep trouble. In every case, employment has been plummeting. So far popular demonstrations against government policies have taken place in the U.K., France, Greece, Russia and throughout Eastern Europe. And the governments of Iceland and Latvia have fallen over the crisis. Governments could therefore be forgiven if they are preoccupied above all with the workers and companies within their own borders. Most officials don't know what to do because they haven't seen this level of distress before. They are living from day to day, desperately improvising and trying to hold off political pressure to take severe measures they know could be satisfying right now but cause bigger damage later. Thinking about how their policies might affect other countries is not their main focus, let alone taking the time to try to coordinate them internationally. Besides, whether it's in Washington, Brussels, Paris, Beijing, Brazilia or Tokyo, it is hard to find many top officials who wouldn't say that whatever measures they are taking that may undermine global commerce are strictly temporary. They all profess that when the crisis is over, they will resume their support for globalization. They underestimate, however, how hard it could be to reverse course. Political figures take comfort, too, from the global institutions that were not present in the 1930s -- the IMF, the World Bank and the World Trade Organization, all of which are assumed to be keeping globalization alive. This is a false sense of security, since these institutions are guided by sovereign countries. Government officials often feel that because they are going to endless crisis summit meetings -- the next big one is in London on April 2, when the world's top 20 nations will be assembling -- that some international coordination is actually taking place. This is mostly an illusion. With a few exceptions, such as the so-called Plaza Agreements of 1984 when currencies were realigned, it is difficult to point to a meeting where anything major has been said and subsequently implemented. But as the pressure on politicians mounts, decisions are being made on an incremental and ad hoc basis that amounts to a disturbing trend. Classic trade protectionism is on the rise. In the first half of 2008, the number of investigations in the World Trade Organization relating to antidumping cases -- selling below cost -- was up 30% from the year before. Washington has recently expanded sanctions against European food products in retaliation for Europe's boycott against hormone- treated American beef -- an old dispute, to be sure, but one that is escalating. In the last several months, the E.U. reintroduced export subsidies on butter and cheese. India raised tariffs on steel products, as did Russia on imported cars. Indonesia ingenuously designated that just a few of its ports could be used to import toys, creating a trade-blocking bottleneck. Brazil and Argentina have been pressing for a higher external tariff on imports into a South American bloc of countries called Mercosur. Just this week, the E.U. agreed to levy tariffs on American exports of biodiesel fuel, possibly a first shot in what may become a gigantic trade war fought over different environmental policies -- some based on taxes, some on regulation, some on cap and trade -- being embraced by individual countries. Much bigger problems have arisen in more non-traditional areas and derive from recent direct intervention of governments. The much-publicized "Buy America" provision of the U.S. stimulus package restricts purchases of construction-related goods to many U.S. manufacturers, and although it is riddled with exceptions, it does reveal Washington's state of mind. The bailout of GM and Chrysler is a purely national deal. Such exclusion against foreign firms is a violation of so-called "national treatment" clauses in trade agreements, and the E.U. has already put Washington on notice that it will pursue legal trade remedies if the final bailout package is discriminatory. Uncle Sam is not the only economic nationalist. The Japanese government is offering to help a broad array of its corporations -- but certainly not subsidiaries of foreign companies in Japan -- by purchasing the stock of these firms directly, thereby not just saving them but providing an advantage over competition from non-Japanese sources. The French government has created a sovereign wealth fund to make sure that certain "national champions," such as car- parts manufacturer Valeo and aeronautics component maker Daher, aren't bought by foreign investors. Government involvement in financial institutions has taken on an anti-globalization tone. British regulators are pushing their global banks to redirect foreign lending to the U.K. when credit is sorely needed and where it can be monitored. Just this past week, the Royal Bank of Scotland announced it was closing shop in 60 foreign countries. Western European banks that were heavily invested in countries such as Hungary, the Czech Republic and the Baltics have pulled back their credits, causing a devastating deflation throughout Eastern Europe. The Swiss are reportedly considering more lenient accounting policies for loans their banks make domestically as opposed to abroad. This de-globalizing trend could well be amplified by Washington's effort to exercise tight oversight of several big financial institutions. Already AIG's prime Asian asset, American International Assurance Company, is on the block. As the feds take an ever bigger stake in Citigroup, they may well force it to divest itself of many of its prized global holdings, such as Banamex in Mexico and Citi Handlowy in Poland. It appears that new legislation under the Troubled Asset Relief Program will also restrict the employment of foreign nationals in hundreds of American banks in which the government has a stake. Whether or not it goes into bankruptcy, General Motors will be pressed to sell many of its foreign subsidiaries, too. Even Chinese multinationals such as Haier and Lenovo are beating a retreat to their own shores where the risks seem lower than operating in an uncertain global economy. The government in Beijing is never far away from such fundamental strategic decisions. Then there is the currency issue. Economic nationalists are mercantilists. They are willing to keep their currency cheap in order to make their exports more competitive. China is doing just that. A big question is whether other Asian exporters that have been badly hurt from the crisis -- Taiwan, South Korea and Thailand, for example -- will follow suit. Competitive devaluations were a major feature of the 1930s. It's no accident that the European Union has called an emergency summit for this Sunday to consider what to do with rising protectionism of all kinds. There are a number of reasons why economic nationalism could escalate. The recession could last well beyond this year. It is also worrisome that the forces of economic nationalism were gathering even before the crisis hit, and have deeper roots than most people know. Congress denied President Bush authority to negotiate trade agreements two years ago, fearing that America was not benefiting enough from open trade, and an effort to reform immigration was paralyzed for years. Globally, international trade negotiations called the Doha Round collapsed well before Bear Stearns and Lehman Brothers did. Concerns that trade was worsening income distribution were growing in every major industrial nation since the late 1990s. Whenever countries turned inward over the past half-century, Washington was a powerful countervailing force, preaching the gospel of globalization and open markets for goods, services and capital. As the Obama administration works feverishly to fire up America's growth engines, patch up its financial system and keep its housing market from collapsing further, and as its major long-term objectives center on health, education and reducing energy dependence on foreign sources, the country's preoccupations are more purely domestic than at any time since the 1930s. In the past, American business leaders from companies such as IBM, GE, Goldman Sachs and, yes, Citigroup and Merrill Lynch beat the drum for open global markets. As their share prices collapse, some voices are muted, some silenced. It is not easy to find anyone in America who has the stature and courage to press for a more open global economy in the midst of the current economic and political crosswinds. And given that the global rot started in the U.S. with egregiously irresponsible lending, borrowing and regulation, America's brand of capitalism is in serious disrepute around the world. Even if President Obama had the mental bandwidth to become a cheerleader for globalization, America's do-as-I-say-and-not-as-I-do leadership has been badly compromised. If economic nationalism puts a monkey wrench in the wheels of global commerce, the damage could be severe. The U.S. is a good example. It is inconceivable that Uncle Sam could mount a serious recovery without a massive expansion of exports -- the very activity that was responsible for so much of America's economic growth during the middle of this decade. But that won't be possible if other nations block imports. For generations, the deficits that we have run this past decade and the trillions of dollars we are spending now mean we will be highly dependent on foreign loans from China, Japan and other parts of the world. But these will not be forthcoming at prices we can afford without a global financial system built on deep collaboration between debtors and creditors -- including keeping our market open to foreign goods and services. The Obama administration talks about a super-competitive economy, based on high-quality jobs -- which means knowledge-intensive jobs. This won't happen if we are not able to continue to bring in the brightest people from all over the world to work and live here. Silicon Valley, to take one example, would be a pale shadow of itself without Indian, Chinese and Israeli brain power in its midst. More generally, without an open global economy, worldwide industries such as autos, steel, banking and telecommunications cannot be rationalized and restructured efficiently, and we'll be doomed to have excessive capacity and booms and busts forever. The big emerging markets such as China, India, Brazil, Turkey and South Africa will never be fully integrated into the world economy, depriving them and us of future economic growth. The productivity of billions of men and women entering the global workforce will be stunted to everyone's detriment. Of course, no one would say that globalization is without its problems. Trade surges and products made by low-priced labor can lead to job displacement and increasing income inequality. Proud national cultures can be undermined. But these challenges can be met by reasonable regulation and by domestic policies that provide a strong social safety net and the kind of education that helps people acquire new skills for a competitive world. With the right responses of governments, the benefits should far outweigh the disadvantages. For thousands of years, globalization has increased global wealth, individual choice and human freedom. The point is, economic nationalism, with its implicit autarchic and save-yourself character, embodies exactly the wrong spirit and runs in precisely the wrong direction from the global system that will be necessary to create the future we all want. As happened in the 1930s, economic nationalism is also sure to poison geopolitics. Governments under economic pressure have far fewer resources to take care of their citizens and to deal with **rising anger and social tensions**. Whether or not they are democracies, their tenure can be threatened by popular resentment. The temptation for governments to whip up enthusiasm for something that distracts citizens from their economic woes -- a **war or a jihad against unpopular minorities**, for example -- is **great**. That's not all. As an economically enfeebled South Korea withdraws foreign aid from North Korea, could we see an even more irrational activity from Pyongyang? As the Pakistani economy goes into the tank, will the government be more likely to compromise with terrorists to alleviate at least one source of pressure? As Ukraine strains under the weight of an IMF bailout, is a civil war with Cold War overtones between Europe and Russia be in the cards? And beyond all that, how will economically embattled and inward-looking governments be able to deal with the critical issues that need global resolution such as control of nuclear weapons, or a treaty to manage climate change, or help to the hundreds of millions of people who are now falling back into poverty?

### Economic leadership prevents global economic collapse – resiliency is inevitable unless US influence collapses

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Michael, The Case for Goliath: How America Acts As the World’s Government in the Twenty-First Century, p. 192-195

Although the spread of nuclear weapons, with the corresponding increase in the likelihood that a nuclear shot would be fired in anger somewhere in the world, counted as the most serious potential consequence of the abandonment by the United States of its role as the world's government, it was not the only one. In the previous period of American international reticence, the 1920s and 1930s, the global economy suffered serious damage that a more active American role might have mitigated. A twenty-first-century American retreat could have similarly adverse international economic consequences. The economic collapse of the 1930s caused extensive hardship throughout the world and led indirectly to World War II by paving the way for the people who started it to gain power in Germany and Japan. In retrospect, the Great Depression is widely believed to have been caused by a series of errors in public policy that made an economic downturn far worse than it would have been had governments responded to it in appropriate fashion. Since the 1930s, acting on the lessons drawn from that experience by professional economists, governments have taken steps that have helped to prevent a recurrence of the disasters of that decade.' In the face of reduced demand, for example, governments have increased rather than cut spending. Fiscal and monetary crises have evoked rescue efforts rather than a studied indifference based on the assumption that market forces will readily reestablish a desirable economic equilibrium. In contrast to the widespread practice of the 1930s, political authorities now understand that putting up barriers to imports in an attempt to revive domestic production will in fact worsen economic conditions everywhere. Still, a serious, prolonged failure of the international economy, inflicting the kind of hardship the world experienced in the 1930s (which some Asian countries also suffered as a result of their fiscal crises in the 1990s) does not lie beyond the realm of possibility. Market economies remain subject to cyclical downturns, which public policy can limit but has not found a way to eliminate entirely. Markets also have an inherent tendency to form bubbles, excessive values for particular assets, whether seventeenth century Dutch tulips or twentieth century Japanese real estate and Thai currency, that cause economic harm when the bubble bursts and prices plunge. In responding to these events, governments can make errors. They can act too slowly, or fail to implement the proper policies, or implement improper ones. Moreover, the global economy and the national economies that comprise it, like a living organism, change constantly and sometimes rapidly: Capital flows across sovereign borders, for instance, far more rapidly and in much greater volume in the early twenty-first century than ever before. This means that measures that successfully address economic malfunctions at one time may have less effect at another, just as medical science must cope with the appearance of new strains of influenza against which existing vaccines are not effective. Most importantly, since the Great Depression, an active **American international economic role** has been crucial both in fortifying the conditions for global economic well-being and in coping with the problems that have occurred, especially periodic recessions and currency crises, by applying the lessons of the past. The absence of such a role could weaken those conditions and aggravate those problems. The overall American role in the world since World War II therefore has something in common with the theme of the Frank Capra film It's a Wonderful Life, in which the angel Clarence, played by Henry Travers, shows James Stewart, playing the bank clerk George Bailey, who believes his existence to have been worthless, how life in his small town of Bedford Falls would have unfolded had he never been born. George Bailey learns that people he knows and loves turn out to be far worse off without him. So it is with the United States and its role as the world's government. Without that role, the world very likely would have been in the past, and would become in the future, a less secure and less prosperous place. The abdication by the United States of some or all of the responsibilities for international security that it had come to bear in the first decade of the twenty-first century would deprive the international system of one of its principal safety features, which keeps countries from smashing into each other, as they are historically prone to do. In this sense, a world without America would be the equivalent of a freeway full of cars without brakes. Similarly, should the American government abandon some or all of the ways in which it had, at the dawn of the new century, come to support global economic activity, the world economy would function less effectively and might even suffer a severe and costly breakdown. A world without the United States would in this way resemble a fleet of cars without gasoline.

### Empirical studies prove—global capitalism solves war

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Erik, “Future Depends on Capitalizing on Capitalist Peace,” 10/18, Windsor Star, http://www.cato.org/pub\_display.php?pub\_id=5133

With terrorism achieving "global reach" and conflict raging in Africa and the Middle East, you may have missed a startling fact - we are living in remarkably peaceable times. For six decades, developed nations have not fought each other. France and the United States may chafe, but the resulting conflict pitted french fries against "freedom fries," rather than French soldiers against U.S. "freedom fighters." Tony Blair and Jacques Chirac had a nasty spat over the EU, but the English aren't going to storm Calais any time soon. The present peace is unusual. Historically, powerful nations are the most war prone. The conventional wisdom is that democracy fosters peace but this claim fails scrutiny. It is based on statistical studies that show democracies typically don't fight other democracies. Yet, the same studies show that democratic nations go to war about as much as other nations overall. And more recent research makes clear that only the affluent democracies are less likely to fight each other. Poor democracies behave much like non-democracies when it comes to war and lesser forms of conflict. A more powerful explanation is emerging from newer, and older, empirical research - the "capitalist peace." As predicted by Montesquieu, Adam Smith, Norman Angell and others, nations with high levels of economic freedom not only fight each other less, they go to war less often, period. Economic freedom is a measure of the depth of free market institutions or, put another way, of capitalism. The "democratic peace" is a mirage created by the overlap between economic and political freedom. Democracy and economic freedom typically co-exist. Thus, if economic freedom causes peace, then statistically democracy will also appear to cause peace. When democracy and economic freedom are both included in a statistical model, the results reveal that economic freedom is considerably more potent in encouraging peace than democracy, 50 times more potent, in fact, according to my own research. Economic freedom is highly statistically significant (at the one-per-cent level). Democracy does not have a measurable impact, while nations with very low levels of economic freedom are 14 times more prone to conflict than those with very high levels. But, why would free markets cause peace? Capitalism is not only an immense generator of prosperity; it is also a revolutionary source of economic, social and political change. Wealth no longer arises primarily through land or control of natural resources. New Kind of Wealth Prosperity in modern societies is created by market competition and the efficient production that arises from it. This new kind of wealth is hard for nations to "steal" through conquest. In days of old, when the English did occasionally storm Calais, nobles dreamed of wealth and power in conquered lands, while visions of booty danced in the heads of peasant soldiers. Victory in war meant new property. In a free market economy, war destroys immense wealth for victor and loser alike. Even if capital stock is restored, efficient production requires property rights and free decisions by market participants that are difficult or impossible to co-ordinate to the victor's advantage. The Iraqi war, despite Iraq's immense oil wealth, will not be a money-maker for the United States. Economic freedom is not a guarantee of peace. Other factors, like ideology or the perceived need for self-defence, can still result in violence. But, where economic freedom has taken hold, it has made war less likely. Research on the capitalist peace has profound implications in today's world. Emerging democracies, which have not stabilized the institutions of economic freedom, appear to be at least as warlike - perhaps more so - than emerging dictatorships. Yet, the United States and other western nations are putting immense resources into democratization even in nations that lack functioning free markets. This is in part based on the faulty premise of a "democratic peace." It may also in part be due to public perception. Everyone approves of democracy, but "capitalism" is often a dirty word. However, in recent decades, an increasing number of people have rediscovered the economic virtues of the "invisible hand" of free markets. We now have an additional benefit of economic freedom - international peace. The actual presence of peace in much of the world sets this era apart from others. The empirical basis for optimistic claims - about either democracy or capitalism - can be tested and refined. The way forward is to capitalize on the capitalist peace, to deepen its roots and extend it to more countries through expanding markets, development, and a common sense of international purpose. The risk today is that faulty analysis and anti-market activists may distract the developed nations from this historic opportunity.

### Prefer our studies—our authors use a testable empirical method

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Erich, “BALANCE OF POWER, GLOBALIZATION, AND THE CAPITALIST PEACE,” http://www.fnf.org.ph/downloadables/Balance%20of%20Power,%20Globalization%20and%20Capitalist%20Peace.pdf

If one does research or summarize the research of others – of course, most of the ideas, theories, and evidence discussed below have been produced by others – one cannot avoid some epistemological commitments. In the social sciences the fundamental choice is whether to pursue an ideographic or a nomothetic approach. Almost all historians choose the ideographic approach and focus on the description of structures or events, whereas most economists and psychologists choose the nomothetic approach and focus on the search for law-like general statements. Sociologists and political scientists are still divided – sometimes even by the Atlantic Ocean. In American political science the nomothetic approach dominates the flagship journal of the profession, the American Political Science Review, as well as more specialized journals, such as International Studies Quarterly, the Journal of Conflict Resolution, or World Politics. In German political science, however, the nomothetic approach has advanced little beyond electoral studies. My own approach is definitely nomothetic. This is related to my training in psychology at one of the first German universities focusing on quantitative research methods in the early 1960s, the University of Hamburg. This epistemological orientation has been reinforced by graduate training in international politics at one of the first American universities emphasizing quantitative research in the late 1960s, Northwestern University, which is located in a suburb of Chicago. Nomothetic research focuses on hypothesizing, testing and establishing law-like general statements or nomological propositions. Examples of such propositions are: The higher average incomes in a nation are, the more likely is democratic government. Or, the more economic freedom in a nation prevails, the less frequently it is involved in war. One characteristic of such propositions is that they say something about observable reality. Whenever you say something about reality, you risk that others find out that you are wrong. If we observed that most poor countries were democracies, but most rich countries were autocracies, then we should reject or, at least, modify the proposition about prosperity and democracy mentioned above.1 Nomothetic researchers look for refutations. They try to falsify their propositions or theories (Popper 1934/1959). If the empirical evidence is compatible with one's theory, then one keeps the hypothetical propositions and regards them as supported – until negative evidence turns up. Although certitude about possession of the truth is beyond the capabilities of human inquiry, growth of knowledge is conceivable by the successive elimination of errors. This epistemological approach borrowed from Popper were easily applicable, if most of our propositions were deterministic, if they claimed to be valid without exceptions. Then, finding a single exception to a general statement – say, about prosperity and democracy – would suffice to falsify the proposition. Looking at poor India nevertheless being democratic, or at fairly rich Kuwait nevertheless being autocratic, would suffice to reject the theory.2 Unfortunately, almost no theory in macroeconomics, macrosociology, or international relations delivers deterministic propositions. Instead we have only probabilistic statements of the type that more prosperous countries are more likely to be democratic than others, or that economically freer countries are more likely to avoid war involvement than others. Probabilistic assertions never can be falsified by pointing to single events which do not fit with theoretical expectations. Instead we have to look at relative frequencies, at correlations or regression coefficients. We need statistical tools to evaluate such propositions. We typically ask the question whether a hypothesized relationship is so strong that it could only rarely occur because of random measurement or sampling error. Probabilistic propositions are regarded as supported only if they jump certain thresholds of significance which are ultimately defined by mere conventions. Researchers are interested in causal propositions, that is, in statements about causes and effects, or determinants and consequences. Such statements can be used for explanation, forecasting, or policy interventions. We need to know more than the mere existence of some association or correlation between, say, prosperity and democracy, or economic freedom and the avoidance of military conflict. We need to know whether prosperity promotes democracy, or whether democracy promotes growth, or whether, possibly, both statements might be defensible or, for the time being, taken for 'true'. While a correlation between two variables, like prosperity and democracy, is equally compatible with the simple alternative causal propositions that prosperity causes democracy, and that democracy causes prosperity, this ambiguity no longer necessarily applies in more complex theoretical models. There, we tend to explain a single effect by a number of causes. For example, one may contend that democracy is promoted by prosperity as well as by a capitalist economic order (or economic freedom). We can take such a theoretical contention – which may be true or false, compatible with the data or not – as a starting point for specifying a regression equation.3 If both theoretical statements – about the democratizing effects of prosperity and capitalism – were true, then the regression coefficients of both variables should be positive and significant. If this is what we find in empirical research, then we regard the two propositions as provisionally supported. But final proofs remain impossible in empirical research. It is conceivable that some nonbeliever in the two propositions suggests a third measurable determinant of democracy. Before it actually is included in the regression equation, one never knows what its inclusion results in. Possibly, the previously significant and positive regression coefficients of prosperity and capitalism might be reduced to insignificance or even change signs. Then a previously supported causal proposition would have to be overturned and rejected. The claim of causality implies more than observable association or correlation. It also implies temporal precedence of causes before effects. If one wants to test the causal proposition that prosperity contributes to democratic government, or that economic freedom contributes to the avoidance of military conflict, then one should measure prosperity or economic freedom before their hypothesized effects occur – certainly not later. If there is doubt about the direction of causality, as there frequently is, one might also look at the relationships between, say, earlier prosperity and later democracy as well as between earlier democracy and later prosperity. Although such investigations may become technically complicated, it might suffice here to keep the general principles in mind. From causal propositions we derive expectations about correlation or regression coefficients. But conclusions from correlations to causal propositions are not justified. One simply can never 'verify' causal statements by correlations. From causal propositions we also derive expectations about temporal precedence. As long as empirical evidence fits one's theoretical expectations, one regards the propositions or theory as provisionally supported and works with them. There is another complication. As illustrated by the debate about the effects of trade and economic interdependence on the avoidance of military conflict below, full accordance of empirical studies and verdicts with theories is the exception rather than the rule – if it ever happens at all. That is why some philosophers of science (for example, Kuhn 1962; Lakatos 1968-69) have been critical of the idea of falsification and warned against premature rejection of propositions. If 'anomalies' or 'falsification' are more or less ubiquitous, then our task is no longer so easy as to choose between theories which have been falsified and therefore deserve rejection and those which are compatible with the facts and therefore deserve to be accepted until negative evidence turns up. Then our task becomes to choose between competing theories, for example about the conflict reinforcing or pacifying impact of trade, and to pick those which fit the data relatively better than others. So, the claim advanced in this review of the literature cannot be that the empirical evidence fits the capitalist peace idea perfectly, but merely that the evidence fits it much better than competing explanations of military conflict and notions about the negative impact of capitalism on the avoidance of conflict and war or the irrelevance of democracy do. The epistemological discussion above could provide no more than a crude 'feel' for empirical research in the social sciences and its pitfalls. Although certitude is beyond reach, it is better to rely on testable, tested and so far supported propositions than on a hodgepodge of ambiguous hunches, contradictory thinking, and unsystematically evaluated empirical evidence.

## Competitiveness – Economic Nationalism – Multilateralism

### Multilateral economic cooperation solves key global threats – especially warming and prolif

Matthews 7 – president of the Carnegie Endowment for International Peace

Jessica, "Europe and the US: Confronting Global Challenges," 11/8, http://www.carnegieendowment.org/files/transcript\_mandelson.pdf

Now, the question I want to answer today is, how do we do this and to what purpose? Firstly, fundamentally, we must engage with economic globalization, accept it, shape it. We’re not going to roll it back, and if we could, we shouldn’t seek to do so. In fact, I’d argue that the preservation of an equitable economic globalization should be the core political commitment at the heart of the transatlantic economic relationship, equivalent in its way to the mutual commitment to democracy that the Atlantic Charter embodied six decades ago, because managed right, an economically integrated world is ultimately not only a more stable and a more equitable world; it is also our principal means of meeting the increasing number of global challenges that require collective action. The reshaping of the global economy and the huge dramatic changes that are taking place in the economic landscape of the world certainly test the nerves of us in Europe and the nerves of you too in the United States. But just because it tests our nerves doesn’t mean to say that these changes are not in our interests. It’s true that some parts of our manufacturing sectors are certainly facing some tough competitive pressure. It is true that this will force us to think about how we choose to educate and to train ourselves in the future, and how we ensure that the benefits of economic growth are equitably shared. That’s a major policy challenge for us on both sides of the Atlantic. It is true that because of these great changes and the huge anxiety that they are generating amongst people on both sides of the Atlantic that policymakers are under increasing pressure to show that our embrace of economic globalization is not naivety, that we’re not being taken for a ride, in other words, by the rest of the world; to show that – as we need to do as policymakers – to show that closing the gate to the outside world is not a better alternative to keeping that gate open to the rest of the world. Now, these debates are broadly the same in Europe and the United States. But in an open global market, we have to understand that the growing economies of the developing world are also a competitive stimulus and a real engine for the growth of our own economies. They are a market for our goods and for our investment. They are a source of downward pressure on consumer prices and inflation at home. They are also the driving force that has lifted perhaps half a billion people out of poverty in half a human lifetime, which is hard to argue against. In defending and preserving this openness to the world and this growth of the global economy and its integration, the EU and the U.S. are faced with some simple realities. The first is that we now live in a world that is increasingly economically multi-polar. One billion new workers have entered the global labor force in the space of just two decades in the world. In those 20-odd years, China has risen from a country with which the EU traded almost literally nothing to becoming our biggest trading partner for manufacturers. In some ways, an older balance of economic power is reasserting itself in the world. In 1830, India and China were the two biggest economies in the world – in 1830. By 2050, they will again be amongst the very largest economies in the world. Of course, this is not the only way of weighing power in the modern world, far from it. But it is fundamental. And that’s in the nature of the fundamental revolution in economic terms, and also political terms, therefore, that the world is undergoing. Now, the machinery of what you might call the Atlantic consensus – the World Bank, the IMF, GATT, G7 or G8 – was conceived and rooted in the assumption that the global economic and political order could and would indeed be governed largely by the Atlantic world. That assumption now no longer holds. There has been a reorientation from the Atlantic to the Pacific and beyond. Now, the multilateral institutions that survive, therefore, will be those ones that are able to adapt to this new 21st century landscape. The second simple reality that I would identify for you is that economic globalization means interdependence. This is not simply a question of global supply chains and production lines. Our open markets are a ladder out of poverty for the developing world. Their growing markets are a source of growth for us. That is the fundamental interdependence that links and joins us and our interests together in the global economy. A world of growing prosperity and economic integration is a more stable world, even if it doesn’t always feel that way Now, for that reason, multilateral institutions in the multilateral trading system will matter more than ever in the new global age of the 21st century. There is no going it alone in this century, in this global age. Interdependence doesn’t allow going it alone in the way that we have tried to practice or imagine it was possible in the past. Our ability to get things done multilaterally will define the extent to which we can shape globalization in a way that makes it equitable and sustainable and binds in the big new players who are emerging in that global economy. It will certainly define the extent to which we can confront huge pressing problems such as global warming, migration, nuclear proliferation, and energy security.

## Competitiveness – Unemployment Impacts – Anti-Muslim Backlash

### Widespread unemployment leads to anti-Muslim backlash

Zaller 10

Robert, “A too-convenient scapegoat,” Broad Street Review, http://www.broadstreetreview.com/index.php/main/article/why\_an\_anti\_muslim\_backlash\_now/

The growing anti-Muslim backlash in the U.S. raises a question: Why now? No such backlash arose after 9/11 itself, when it might most have been expected; nor after the shoe bomber; nor the Christmas bomber; nor the attempted Times Square bombing; nor the Fort Hood shooting. Any of these incidents might easily have triggered such a reaction, yet none did. The current reaction is clearly related to the proposed Islamic community center near Ground Zero and the Reverend Terry Jones’s now-suspended threat to hold a Kuran-burning party in Gainesville. But it’s not apparent why the Park51 project in New York should have been the precipitating agent. Its first announcement, many months ago, aroused little interest. On the face of it, too, it’s far from obvious why building a house of study and prayer, even in a sensitive location, should provoke a greater reaction than than, say, an effort to blow up a crowded part of Manhattan or bring down an airliner. There’s no simple answer to the question, but I can suggest a place to start: Barack Hussein Obama. Polls indicate that about a fifth of our population believes that President Obama himself is a Muslim. This belief overlaps with the persisting myth— recently fanned by the ever-mischievous Newt Gingrich— that Obama isn’t an American citizen. Nativist canards “Foreign” and “unchristian”: These traditionally nativist canards reinforce one another, and suggest to those susceptible to them that the very center of government has been seized by conspirators seeking to destroy American liberty and deliver the country into the hands of “evil-doers,” as George W. Bush famously described America’s alleged enemies. It probably doesn’t help that some of Obama’s most prominent advisors— David Axelrod, Rahm Emanuel, the recently departed Larry Summers— are Jewish. That an inner circle of Jews should be fomenting a Muslim takeover of the U.S. does not, granted, make much sense; but internal coherence isn’t the strong suit of nativist ideology. To be sure, the most rabid version of this theory may be confined to “only” a fifth of the population. But a further segment— say, another fifth or so— remains convinced that, under Obama, the government is stealthily intruding into people’s lives and trying to take away their freedom. This is the basis of the Tea Party movement. Its poster child is the federal health care bill, which actually guarantees private monopoly over a medical system that has brought the U.S. into a dead heat with Slovenia for 37th place in world health outcomes. The left concurs It’s true that the Republicans have fanned the myth that Obamacare is a government takeover, but the susceptibility of a large segment of the public to such nonsense is the core suspicion of virtually anything Obama does. The only thing he gets credit for with this crowd is fighting the senseless war in Afghanistan, which manifestly involves killing Muslims. For some, of course, even this is only a cover story to help conceal the sinister conspiracy that has seized the White House. Strangely enough, much left-of-center opinion appears to concur that Obama has been an excessively activist president. It’s almost an article of faith in these circles that he has tried to do too much while failing to do the most necessary thing: relieving the distressed U.S. economy. It’s true, certainly, that current unemployment numbers are killing Obama, but quite false that he has taken on structural reform. In fact, the reverse is the case: The only thing Obama has done in office is to prop up the two most despised sectors of the U.S. economy: banking and health care. Wall Street and Kaiser Permanente could hardly have asked for a better friend. A cautious temperament From whichever end of the political spectrum one approaches him, then, the question nags: Who is Barack Obama? I suspect this is a problem for Obama personally; it’s certainly one he has wrestled with in his autobiographical musings. More to the point, though, it is one that boxes him in politically. By temperament and experience a very cautious man— as we now know— he seemed hemmed in rather than liberated by his mandate at the polls in 2008. Many on the center and left of American politics exulted in the election of an African-American president. Obama himself seems to have anticipated, with dread, the backlash to follow. He understood, as only a black man could, how deep the roots of racism were in the country, and how shallow and fleeting the mandate of an African-American president would be. He was, in short, defeated in advance. Obama’s instinct was to curry favor with the elites that had groomed him for power, and that no doubt saw in him the accommodating straw man he has proved to be. If one reads the subtext of American political discourse, then, “Muslim” is a code word for “black,” as of course the figure of the “black Muslim” was, not long ago, our ultimate bogeyman. The belief that Obama is a Muslim is, in short, rooted in the fact that he is actually a black man. Witches’ brew For a significant minority, the idea of a black president was and is unacceptable. For another segment, the witches’ brew of a personally suspect chief executive, the specter of a Muslim terrorist threat endlessly manipulated by our new security establishment, and the brutally demoralizing fact of persisting unemployment fuels a Tea Party movement that, while not yet overtly racist and anti-Muslim in its rhetoric, contains all the seeds of the **Know-Nothing nativism** Americans have witnessed often enough in the past. Such tinder made ready kindling for a spark such as the so-called “Ground Zero mosque.” Americans are angry and bewildered about their lives, and with good reason. They no longer belong to the richest country in the world, but only to the one whose riches are the most asymmetrically distributed. Bob Herbert of The New York Times has likened the impact of our misnomered Great Recession (it is actually a good-sized depression) to the tornadoes that recently ripped through wide swaths of New York City, overturning cars, uprooting trees, and wreaking general havoc on ground-level neighborhoods. Herbert rather pathetically concluded with an appeal to the elites in their high-rises, far above the economic storm they themselves created, to spare a dime or two for the masses below. Maybe the masses should be grabbing their pitchforks instead, and turning them on their real tormentors instead of symbolic minority targets like illegal immigrants and, now, peaceable Muslims.

## Competitiveness – Impacts – Economy

### Tech and industrial competitiveness is key to leadership

**Segal 4 – Senior Fellow in CFR**

Adam Segal is a Senior Fellow in China Studies at Council on Foreign Relations [<http://www.foreignaffairs.com/articles/60260/adam-segal/is-america-losing-its-edge>, Published in Foreign Affairs, Nov / Dec 2004, “Is America Losing Its Edge?”]

The United States' global primacy depends in large part on its ability to develop new technologies and industries faster than anyone else. For the last five decades, U.S. scientific innovation and technological entrepreneurship have ensured the country's economic prosperity and military power. It was Americans who invented and commercialized the semiconductor, the personal computer, and the Internet; other countries merely followed the U.S. lead. Today, however, this technological edge--so long taken for granted--may be slipping, and the most serious challenge is coming from Asia. Through competitive tax policies, increased investment in research and development (R&D), and preferential policies for science and technology (S&T) personnel, Asian governments are improving the quality of their science and ensuring the exploitation of future innovations. The percentage of patents issued to and science journal articles published by scientists in China, Singapore, South Korea, and Taiwan is rising. Indian companies are quickly becoming the second-largest producers of application services in the world, developing, supplying, and managing database and other types of software for clients around the world. South Korea has rapidly eaten away at the U.S. advantage in the manufacture of computer chips and telecommunications software. And even China has made impressive gains in advanced technologies such as lasers, biotechnology, and advanced materials used in semiconductors, aerospace, and many other types of manufacturing. Although the United States' technical dominance remains solid, the globalization of research and development is exerting considerable pressures on the American system. Indeed, as the United States is learning, globalization cuts both ways: it is both a potent catalyst of U.S. technological innovation and a significant threat to it. The United States will never be able to prevent rivals from developing new technologies; it can remain dominant only by continuing to innovate faster than everyone else. But this won't be easy; to keep its privileged position in the world, the United States **must get better at** **fostering** **technological** **entrepreneurship** at home. At the moment, it would be premature to declare a crisis in the United States' scientific or technological competitiveness. The United States is still the envy of the world for reasons ranging from its ability to fund basic scientific research to the speed with which its companies commercialize new breakthroughs.

## Competitiveness – Hegemony

### Competitiveness is key to innovation – key to primacy

Martino 7 – Senior Fellow @ FPRI

Rocco Martino, Senior Fellow at the Foreign Policy Research Institute, 2007, “A Strategy for Success: Innovation Will Renew American Leadership,” Orbis, Volume 51, Issue 2)

Much of the foreign policy discussion in the United States today is focused upon the dilemma posed by the Iraq War and the threat posed by Islamist terrorism. These problems are, of course, both immediate and important. However, America also faces other challenges to its physical security and economic prosperity, and these are more long-term and probably **more profound**. There is, first, the threat posed by our declining competitiveness in the global economy, a threat most obviously represented by such rising economic powers as China and India.1 There is, second, the threat posed by our increasing dependence on oil imports from the Middle East. Moreover, these two threats are increasingly connected, as China and India themselves are greatly increasing their demand for Middle East oil.2 The United States of course faced great challenges to its security and economy in the past, most obviously from Germany and Japan in the first half of the twentieth century and from the Soviet Union in the second half. Crucial to America's ability to prevail over these past challenges was our technological and industrial leadership, and especially our ability to continuously recreate it. Indeed, the United States has been unique among great powers in its ability to keep on creating and recreating new technologies and new industries, generation after generation. Perpetual innovation and technological leadership might even be said to be the American way of **maintaining primacy in world affairs**. They are almost certainly what America will have to pursue in order to prevail over the contemporary challenges involving economic competitiveness and energy dependence. There is therefore an **urgent need** for America to resume its historic emphasis on innovation. The United States needs a national strategy focused upon developing **new technologies and creating new industrie**s. Every successful strategy must define an objective or mission, determine a solution, and assemble the means of execution. In this case, the objective is economic superiority; the solution is new industries which build upon the contemporary revolution in information technology; and the means of execution will have to include a partnership of industry, government, and people.3

## Competitiveness – Impact – Economy

### Aerospace competitiveness is key to the economy

Augustine 5 – Retired chair of Lockheed Martin

Norman Augustine, retired chairmen and CEO of Lockheed Martin Corp., charied National Academics Committee on Prospering in the Global Economy of the 21st Century, Aviation Week and Space Technology, “US Science and Technology is on a Losing Path” 2005, Lexis

This transition to a borderless economy provides great opportunities for companies that are prepared to take advantage, as the history of the aerospace industry amply demonstrates. But in any dynamic, technology-intensive industry, leadership can be lost very quickly. Thus, many other industries are now joining the aerospace industry in learning to compete in an uncertain and quickly changing world. Today, candidates for many jobs that currently reside in the U.S. are just a mouse click away in Ireland, India, China, Australia and dozens of other countries. At first, manufacturing jobs were the ones most susceptible to moving overseas. I recently traveled to Vietnam, where the hourly cost of low-skilled workers is about 25 cents, less than 1/20th of the U.S. minimum wage. But the competitive disadvantage is not confined to so-called low-end jobs. Eleven qualified engineers can be hired in India for the cost of just one in the U.S. At the same time, other countries are rapidly enlarging their innovation capacity. They are investing in science and technology and encouraging their highly trained citizens who are working abroad to return home. Even more important, these countries are creating the well-funded schools and universities that will produce future scientists and engineers. The U.S. is not competing well in this new world. Other nations will continue to have the advantage of lower wages, so America must take advantage of its strengths. But those strengths are eroding even as other countries are boosting their capacities. Throughout the 20th century, one of America's greatest strengths has been its knowledge-based resources--particularly its science and technology system. But today, that system shows many signs of weakness. This nation's trade balance in high-technology goods swung from a positive flow of $33 billion in 1990 to a negative flow of $24 billion in 2004. In 2003, foreign students earned 59% of the engineering doctorates awarded by U.S. universities. In 2001, U.S. industry spent more on tort litigation and related costs than on research and development. A major factor determining U.S. competitiveness is the quality of the workforce, and the public school system provides the foundation of this asset. But that system is failing specifically in the fields most important to the future: science, engineering and mathematics. In a recent international test involving mathematical understanding, U.S. students finished 27th among the participating nations. In China and Japan, 59% and 66% of undergraduates, respectively, receive their degrees in science and engineering, compared with 32% in the U.S. In the past, the U.S. economy benefited from the availability of financial capital. But today it moves quickly to wherever a competitive advantage exists, as shown by the willingness of companies to move factories to Mexico, Vietnam and China (see p. 18). One of America's most powerful assets is its free enterprise system, with its inherent aggressiveness and discipline in introducing ideas and flushing out obsolescence. But other nations have recognized these virtues and are seeking to emulate the system. The aerospace industry is especially susceptible to these broader economic trends. Without well-educated scientists and engineers, the industry will not be able to compete with well-organized programs in countries with abundant engineering talent. In addition, security issues in the industry highlight its reliance on homegrown talent, as opposed to importing its people from abroad. Troubles in the aerospace industry also could have **implications throughout the U.S. economy**. In particular, the industry has been especially effective at making use of and producing systems engineers, some of whom eventually move to other industries. If **aerospace were to decline, a considerable portion** of these valuable individuals would be lost.

## Competitiveness – Impact – Economy / Hegemony

### Aerospace industry competitiveness is necessary to sustain the US economy and national security

Marburer 1– Director of the Office of Science and Technology Policy, White House Sponsor for Commission on the Future of the United States Aerospace Industry

John, “The Future Belongs to the Mobile” 11/27/01 http://www.ostp.gov/cs/commission\_on\_the\_future\_of\_the\_united\_states\_aerospace\_industry\_the\_future\_belongs\_to\_the\_ mobile

The President strongly supports your effort. The nation has depended on the aerospace industry for decades to ensure that America leads the world in high technology, including the manufacturing of military and commercial aircraft, satellites, space launch vehicles, weapon systems and telecommunications systems. As a result, our military is the best in the world, our economy has benefited from a positive aerospace balance of trade, and our people and shippers have benefited from having the best and safest aviation system in the world. The public has also benefited from the numerous spin-offs from the aerospace industry, including cellular telephones, precision farming, new medical devices, improved weather forecasting, and hundreds of others. The President wants to make sure that U.S. aerospace leadership continues in the 21st Century. The critically important tasks of this Commission are to help the President establish the direction for the U.S. aerospace industry in this new century, and to support national initiatives on education, defense, security, and energy. This Commission is taking place at a landmark period in our history. The events of September 11 require a national response similar to that following the Soviet launch of Sputnik in 1957. The President has clearly expressed our national determination that all Americans, and indeed the world, will pursue their aspirations free from the threat of global terrorism. The reprehensible terrorist assault on two of our nation's most important facilities have turned a dramatic spotlight on weaknesses in our aerospace and air transportation systems. Even prior to September 11th, however, the United States faced serious challenges in these areas -- our air traffic system - based on 1960's technology and management ideas - was approaching gridlock, needed, but ever tightening environmental requirements on noise and emissions were limiting world-wide flight operations and creating international conflict, our aerospace market leadership was being challenged as an explicit goal of foreign competitors, and our country's investments in long-term aeronautics and space research and development were shrinking rapidly, threatening a crisis in the industry's ability to attracting trained and talented human capitol. We must ensure that the disruption of transportation and services that followed the events of September 11 does not recur. We need to develop a 21st Century global air transportation system that provides safe, secure, efficient and affordable transportation of people, goods and information in peacetime and wartime - enabling people and goods to move freely anywhere, anytime, on time. We need a system that: Enhances national security by strengthening homeland defense while enabling the military to project power anywhere in the world at any time; Increases U.S. economic competitiveness by building a more efficient, higher capacity air transportation system; and Improves the quality of life of all Americans by enabling them to do what they want to do when and where they want to do it. We also need to re-invigorate an innovative aerospace industry that, with the appropriate **incentives and investments**, can develop such a **system and sustain U.S. leadership in the 21st Century**.

**Aerospace Specific**

**Space competitiveness is critical to maintaining leadership**

Young 8 Chair of the Institute for Defense Analyses Research Group, et al.

“Leadership, Management, and Organization for National Security Space”, July 2008, [http://www.armyspace.army.mil/ASJ/Images/National\_Security\_S pace\_Study\_Final\_Sept\_16.pdf](http://www.armyspace.army.mil/ASJ/Images/National_Security_Space_Study_Final_Sept_16.pdf)

Today, U.S. leadership in space provides a vital national advantage across the scientific, commercial, and national security realms. In particular, space is of critical importance to our national intelligence and warfighting capabilities. The panel members nevertheless are unanimous in our conviction that, without significant improvements in the leadership and management of NSS programs, U.S. space preeminence will erode to the extent that space ceases to provide a competitive national security advantage. Space technology is rapidly proliferating across the globe, and many of our most important capabilities and successes were developed and fielded with a government technical workforce and a management structure that no longer exist. U.S. Leadership in Space is a **Vital National Advantag**e Space capabilities **underpin U.S. economic, scientific, and military leadership.** The space enterprise is embedded in the fabric of our nation’s economy, providing technological leadership and sustainment of the industrial base. To cite but one example, the Global Positioning System (GPS) is the world standard for precision navigation and timing. Global awareness provided from space provides the ability to effectively plan for and respond to such critical national security requirements as intelligence on the military capabilities of potential adversaries, intelligence on Weapons of Mass Destruction (WMD) program proliferation, homeland security, and missile warning and defense. Military strategy, operations, and tactics are predicated upon the availability of space capabilities. The military use of space-based capabilities is becoming increasingly sophisticated, and their use in Operation Enduring Freedom and Operation Iraqi Freedom is pervasive.

## Competitiveness – AT: Krugman

### Krugman’s wrong – competitiveness theory is true

Howes and Singh 2k – Professors of Economics

Candace Howes and Ajit Singh, Competitiveness Matters The Limitations of the Krugman Thesis. pages 3-6.

Underlying Krugman's critique of the concept of national competitiveness is a standard neoclassical model in which the effects of trade on a country's standard of living manifest themselves mainly through changes in the terms of trade brought about by the equilibrating adjustments of exchange rates.2 Because complete wage price flexibility is assumed, and because demand for traded goods is assumed to be perfectly elastic at world prices, balance of payments disequilibria, including those that may arise between countries due to differences in rates of productivity growth, can be smoothly resolved by exchange rate adjustments. Under neoclassical assumptions then, differences in relative productivity growth and the trade imbalances that may follow cannot have any effect on demand, output, employment, or inflation. However, in the real world of incomplete wage price flexibility, the adjustment process may be far from smooth. It may entail leapfrogging inflation and considerable adjustment in quantities, that is, in real output and employment. These difficulties may be illustrated by considering the experience of an advanced country (the United Kingdom in the mid 1970s). Following the first oil price shock in 1973 74, the U.K. economy, which was not then a major producer and exporter of oil, suffered an adverse movement in its terms of trade due to the OPEC oil price increase. The size of the shock was estimated to have amounted to about 4 percent of CDP. Instead of a smooth adjustment of the economy through movements in the exchange rates, there was a protracted process that involved redistributive struggles between various social groups over the diminished national pie. The net result was a doubling of the rate of unemployment, a quadrupling of the rate of inflation, a lull blown financial crisis, and ultimately the humiliation for an advanced industrial country of being forced to accept an IMP rescue package, before internal and external equilibria could be restored.' Thus even a relatively small terms of trade shock can have serious repercussions even in an advanced country for an economy, depending on the dynamics of the adjustment process. The validity of Krugman's analysis of national competitiveness requires an abstraction from such labor market dynamics. There is a further more serious problem with the Krugman model of equilibrating adjustment between countries through prices, that is, changes in exchange rates. This arises not so much from the abstractions made with respect to the labor market dynamics but, importantly, it is caused by the neglect of certain essential features of the contemporary product markets. In a wide range of manufactured products these markets are characterized by oligopolistic structures. This leads to a situation that competition now takes place to a considerable extent on the basis of nonprice factors such as quality, marketing, design, reliability, and service. This aspect of international trade is related to the empirical paradox originally observed by Kaldor (1978). He found that for countries like Germany and Japan that increased their share of world markets in manufactures in the 1960s and the early 1970s, prices and costs relative to other countries (expressed in a common currency) rose rather than declined. On the other hand, the share of the United Kingdom and the United States in the world exports of manufactured goods fell despite the fact that their prices and costs relative to other countries were decreasing. Fagerherg (1996, table 1) has updated Kaldor's original analysis for the years 1963 through 1975 to the period 1978 through 1994; he has also extended it to include twelve leading countries for manufactured exports. He finds a positive relationship still exists between world market share and relative unit labor costs.' It is notable that the East Asian NICs, which have gained large increases in market share, have recorded rising relative unit labor costs. From a neoclassical perspective, there would appear then to be a generally perverse relationship between a country's world market share and its relative prices. On the other hand, Fagerberg also observed, seemingly consistent with neoclassical theory, a positive correlation between a country's rate of productivity growth and its change in world market share. An important explanation for these observed phenomena lies partly in the fact mentioned earlier, that is, the increasing role of technology and other nonprice factors its international trade. The reason for the positive association between productivity growth and market share is that countries with high rates of productivity growth also have high rates of investment and output growth. Such countries thereby achieve faster turnover of machines, faster technical progress (to the extent that technical progress is embodied in new capital goods), greater learning by doing, and quicker development of new products.5 As a consequence, as Kaldor (1981, 603) observed: "Basically in a growing world economy the growth of exports is mainly to be explained by the income elasticity of demand of foreign countries for a country's products; but it is a matter of the innovative ability and adaptive capacity of its manufacturers whether this income elasticity will tend to be relatively large or small." Kaldor's emphasis on technological development as the key nonprice factor in international competition also finds confirmation in the data on R&D analyzed by Fagerberg. He shows there is a significant positive relationship between the change in a country's R&D as a share of GOP and growth in its world market share.' Empirically, then, market share growth is better explained by relative productivity growth (and the associated growth of investment) than by falling relative unit labor costs. These analytical and empirical findings, when coupled with the concept of cumulative causation, have **serious** **implications for the Krugman analysis**. It will be recalled that one of Krugman's main points is to suggest that a nation's standard of living is determined by its own long term productivity growth rather than its productivity growth relative to others (subject to a terms of trade effect discussed earlier). However, if countries' relative productivity growth is an indicator of their relative nonprice competitiveness, it means that a country with relatively slow productivity growth will not only have a smaller growth of market share but that because of cumulative causation, its performance may decline further. Corporations in countries that become technologically uncompetitive and start to lose market share will see their profits fall, leading to a lower rate of investment, slower technical progress, and hence even greater noncompetitiveness than before. Left to themselves these dynamic market forces can therefore lead to a cumulative decline in a country's share of world markets making it thereby more difficult for its economy to operate at full potential. To counteract such vicious circle dynamics requires supply side measures that can improve a country's technological capabilities. This point can also be looked at from another perspective. What are the implications of technical change abroad for a country's standard of living? To analyze this issue, let us suppose that one of the United States' main trading partners (say Japan) has increased its trend rate of technical progress due, for example, to an acceleration in the rate of investment in higher education and science. This has no immediate effect on U.S. productivity growth. Suppose further, however, that this technical change in Japan, although to some extent complementary in the sense of increasing the demand for U.S. goods in Japan, is largely "competitive," that is, Japan starts to export better quality goods in those industries where it competes with the United States. The end result of this process through cumulative causation may be a further decline in U.S. competitiveness and hence productivity growth in the way outlined above, unless the United States is able to adapt to new circumstances either by imitation or by technological development of its own. In the real world of international competition today, such adaptation is crucial to maintain a mix of exports for which the world income elasticity of demand and the potential for productivity growth are sufficient to encourage a virtuous circle of growth, investment, and technical change. To sum up, contrary to Krugman, there are good analytical and empirical reasons for the view that relative productivity growth does matter profoundly. With so much trade based on nonprice competitiveness, the trade balance can rarely be achieved solely through exchange rate manipulation or only at great cost in terms of employment and real income growth! More¬over, greater productivity growth abroad, as a result of faster technical prog¬ress there, is likely to have negative consequences for productivity growth in the home economy unless corrective measures are taken to enhance the country's technological capabilities. Thus even an advanced country cannot afford to ignore its international competitive position if it wishes to improve its standard of living in the long run.' Turning to Krugman's normative objections to the concept of international competitiveness as carrying the implication that trade is a zero sum game, the foregoing analysis suggests that this objection is also not well founded. To the extent that international competitiveness requires **leapfrogging competition** between countries in technological developments, this may result in a Pareto improvement in world welfare. To sum up, once the severe limitations of Krugman's model in its application to the real world are recognized, his analytical and empirical critique of the concept of national competitiveness loses much of its force.

## Space Leadership – Impact – Alt 🡺 Military Competition

### The alternative to leadership is military competition

-the international community desires US peaceful development of space

Loureiro 10 – Major in Army

Luis, Retired Army Major, “The Free World Is Losing NASA's Space Leadership,” Space Daily, http://www.spacedaily.com/reports/The\_Free\_World\_Is\_Losing\_NASA\_Space\_Leadership\_999.html

Without NASA's leadership, who will guide the world in peaceful space applications? Without NASA there is a void of experienced leaders well grounded in science. Indeed, we are approaching a new era in which space will be exploited by private, political, economic and military interests - not only in LEO, but also in deep space exploration. Will countries continue along the moral high ground of benefiting all mankind with the fruits of exploration and innovation or will space become a battleground for national greed and gain? America should not decide NASA's future merely on the basis of budgetary expedience. Space exploration is a matter that affects the rights and freedoms of people around the world. The rights and the dreams of many countries are closely tied to NASA, ESA and other recognized space agencies. The rich history of NASA brought the world Voyager 1, Apollo, robots on Mars, Kepler, Cassini-Huygens, Curiosity and so many more. Citizens of foreign countries around the globe hope and pray for a changed view of NASA among America's political leaders. NASA's successes and legacy are not only America's heritage, but that of all free countries. We long to discover new scientific horizons in space that will improve our lives and allow our countries to succeed and to live in a **peaceful future**.

## Space Leadership – Soft Power Impact

### US Soft Power is key to solving every major impact

Stanley 7- Member of the National Security Advisement Board

Elizabeth Stanley, PhD in Government From Harvard University, Assistant Professor at George Town University, Member of the National Security Advisement Board of Sandia National Laboratories, “International perceptions of U.S. Nuclear Policy” <http://www.prod.sandia.gov/cgi-bin/techlib/access-control.pl/2007/070903.pdf>

Such reputation effects can have significant impact in terms of gaining international cooperation in addressing global issues that require multilateral solutions – and given the interdependent nature of the world today, most issues fall into this category. In contrast to a state’s “hard power” (military and economic might), “soft power” (a state’s culture, values and institutions) provides an indirect way to influence others. Soft power is an invaluable asset to: (1) keep potential adversaries from gaining international support and winning moderates over to their causes; (2) influence neutral and developing states to support US leadership; and, (3) convince allies to support and share the international security burden. The United States needs soft power assets (including “the moral high ground”) to solve these problems multilaterally and proactively. For example, one of the “wicked problems” (problems having complex, adaptive, unpredictable components) that US nuclear policy and posture is trying to address is global proliferation of WMD. Yet, WMD proliferation is not a problem that the United States can address effectively alone. To address global proliferation concerns, the United States needs the rest of the world to participate in the process. Given how complex the WMD proliferation problem is, this requires not only other international actors to commit to solving the “problem” with us but that they have a similar understanding of what the “problem” is. This common problem definition is not possible when the rest of the world has negative perceptions of the United States, when US policies and actions (in the nuclear and non-nuclear arenas) are perceived as unilateral and hypocritical. Indeed, this paper suggests that many international actors appear to view US policy and actions as one of the *contributors to* the WMD proliferation problem. In other words, US actions actually affect how other states define the problem, and how they define the problem affects what they believe the “right” solution is. Given their different understanding, it is not surprising that the “wicked” problem becomes even thornier to address. In short, how other international actors perceive US policies and actions matters a great deal in their decisions about how much they will cooperate on the US policy goal of non-proliferation.  (continued)  How important is soft power, anyway? Given its vast conventional military power, does the United States even need soft power? Some analysts argue that US military predominance is both possible and desirable over the long term, and thus soft power is not important. But a growing consensus disagrees. These analysts argue that soft power is critical for four reasons. First, soft power is invaluable for keeping potential adversaries from gaining international support, for “winning the peace” in Afghanistan and Iraq, and for convincing moderates to refrain from supporting extremist terrorist groups. Second, soft power helps influence neutral and developing states to support US global leadership. Third, soft power is also important for convincing allies and partners to share the international security burden.14 Finally, and perhaps most importantly, given the increasing interdependence and globalization of the world system, soft power is critical for addressing most security threats the United States faces today. Most global security threats are impossible to be countered by a single state alone. Terrorism, weapons of mass destruction (WMD) proliferation, failed and failing states, conflicts over access to resources, are not confined to any one state. In addition, disease, demographic shifts, environmental degradation and global warming will have negative security implications as well.15 All of these potential threats share four traits: (1) they are best addressed proactively, rather than after they develop into full-blown crises; (2) they require multi-lateral approaches, often under the umbrella of an international institution; (3) they are not candidates for a quick fix, but rather require multi-year, or multi-decade solutions; and, (4) they are “wicked” problems. Given these four traits, soft power is critical for helping to secure the international, multi-lateral cooperation that will be necessary to address such threats effectively.

## Space Leadership – Link – Key to Soft Power

### Tech exists and key to soft power

NSS 7 – Joseph Rouge, SES Acting Director, National Security Space Office (“Space Based Solar Power As An Opportunity or National Security,” http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf, October 9, 2007)

The SBSP Study Group found that no outright policy or legal showstoppers exist to prevent the development of SBSP. Full‐scale SBSP, however, will require a permissive international regime, and construction of this new regime is in every way a challenge nearly equal to the construction of the satellite itself. The interim review did not uncover any hard show‐stoppers in the international legal or regulatory regime. Many nations are actively studying Space‐Based Solar Power. Canada, the UK, France, the European Space Agency, Japan, Russia, India, and China, as well as several equatorial nations have all expressed past or present interest in SBSP. International conferences such as the United Nations‐connected UNISPACE III are continually held on the subject and there is even a UN‐affiliated non‐governmental organization, the Sunsat Energy Council, that is dedicated to promoting the study and development of SBSP. The International Union of Radio Science (URSI) has published at least one document supporting the concept, and a study of the subject by the International Telecommunications Union (ITU) is presently ongoing. There seems to be significant global interest in promoting the peaceful use of space, sustainable development, and carbon neutral energy sources, indicating that perhaps an open avenue exists for the United States to exercise “soft power” via the development of SBSP. That there are no show‐stoppers should in no way imply that an adequate or supportive regime is in place. Such a regime must address liability, indemnity, licensing, tech transfer, frequency allocations, orbital slot assignment, assembly and parking orbits, and transit corridors. These will likely involve significant increases in Space Situational Awareness, data‐sharing, Space Traffic Control, and might include some significant similarities to the International Civil Aviation Organization’s (ICAO) role for facilitating safe international air travel. Very likely the construction of a truly adequate regime will take as long as the satellite technology development itself, and so consideration must be given to beginning work on the construction of such a framework immediately.

## Space Leadership – Impact – Key to Cooperation

### Space leadership is a pre-requisite to international cooperation

Smith 11 – Colonel, PhD Candidate @ Reading in UK

Colonel M.V. Smith, PhD student in the strategic studies program under Professor Colin Gray at the University of Reading in the UK, former Chief of Future Concepts (Dream Works) for the National Security Space Office at the Pentagon, 3-2011, Comment on a Space Review article written by Christopher Stone (MBA Georgetown), http://www.thespacereview.com/article/1797/1

Mr Stone makes a brilliant point in this article that I'd like to highlight and emphasise. "American leadership in space" **does NOT imply** dominance or hegemony, as many detractors assert. It simply means being the best at spacefaring activities. Unless America is recognised as the **best at key spacefaring capabilities**, no one will **care to partner with us** for any reason other than to constrain our freedom of action and to pick our pockets of classified data and intellectual property. Being the best means doing things routinely that others cannot, and promoting the operational and industrial bases that produce such performance. Ignoring the strategic importance of national spacepower across the civil and security sectors has resulted in failure to make timely decisions. As Mr Stone points out, we now have no way to lift astronauts to the ISS, but we also have allowed our space industrial base to atrophy in several critical areas.

## Space Leadership – Chinese Competition

### US space leadership key to check Chinese expansionism

Sabathier and Faith 11

\*Vincent G. sabathier has more than 20 years of experience in aerospace, president of Sabathier Consulting,senior associate with the technology and public policy program at the CSIS. G. \*\*Ryan Faith is a research analyst at the space foundation. “The Global Impact of the Chinese Space Program,” in, Space Power: A Crowded Field, World Politics Review, 2011

However, experience has shown that budget size is not a reliable indicator of the security of space assets themselves. It is easy to state, as did U.S. President Barack Obama on April 15, 2010, that the moon is not of significant interest and that “We’ve been there before.” But the fact is, the U.S. would be hard-pressed to land another astronaut on the moon by 2025, given the difficulty in finding a reliable and affordable replacement for the Space Shuttle. Before the recent budget freeze, NASA had been unable to produce the heavy launch vehicle needed to go beyond low earth orbit, as mandated by Congress. NASA subsequently lost $6 billion in budgeting dedicated to the program for the period 2011-2015, and such a launcher will not be available before 2020 at best. Although China’s space program has historically been isolated and forced into the indigenous development of a number of capabilities, it has more recently tried to engage internationally. As it grows, China will attract more and more partners. In March, the European Union released space-policy guidance directing member states to cooperate more closely with China on space technology and exploration. Although current U.S. space policy explicitly encourages more international cooperation, such cooperation with China is not in the cards. For that matter, even U.S.-EU cooperation has declined sharply, resulting in a great deal of frustration in Europe. America’s other main partner in space, Japan, was already struggling with strict budget limitations, despite the recent successes of its space agency. And the budgetary impact of the 2011 Tohoku earthquake and subsequent tsunami has yet to be fully felt. Although Japan has expressed a commitment to continue its space activities, these events make it unlikely that Japan will either accelerate its space program or significantly increase its budget for space anytime soon. Even without considering the national benefits it has generated, China’s space program has already made a significant contribution to the global understanding of space activity by demonstrating that space must now be shared and managed at the international level. As China grows in space and introduces other nations to space, this will become all the more critical. Space is becoming commoditized, and as the knowledge necessary to use it diffuses and space applications themselves become commonplace, space will no longer be the domain of the few and the brave. Though the asymmetric military and economic advantages the U.S. derives from using space still exist, they are decreasing quickly. For the near future, China will not be able to compete directly with Western nations in terms of military space, but it will certainly be able deny them the use of those capabilities. If by the end of this decade the U.S. is not able to structure truly effective international cooperation or mutually beneficial bilateral cooperation in civil space beyond the limited scope of the ISS, China will be able to use the leverage of its space program as a foreign policy tool without any meaningful competition.

## Space Leadership – AT: Human Spaceflight CP

### Human flight is not sufficient to sustain leadership

Space Daily 11

“"Me-Too-Ism" Is Alive, But Not Well,” 2011, http://www.spacedaily.com/reports/Me\_Too\_Ism\_Is\_Alive\_But\_Not\_Well\_999.html

NASA is a rudderless ship. No one is in charge of national security space. Where are the leaders and the leadership? Innovation and creativity are almost nowhere to be found in government agencies and contractor organizations. There are a few bright spots in the commercial/entrepreneurial world. In the launch business, there is spaceX. In the satellite business, there are several small satellite developers. In the human spaceflight arena, there are many exciting activities. But, this is **not enough** to sustain American space leadership. The traditional space community needs to rethink its priorities, approaches and objectives to create a vibrant and exciting set of space goals for the future. Otherwise, there may be no future U.S. space leadership role.

## Economy Advantage – Spending Good – Employment

### Only a public sector investment can maximize private sector employment – no risk of a turn

Harvey 11 – Professor of Economics @ TCU

John Harvey, 3-2011, “The Big Danger In Cutting The Deficit,” http://www.forbes.com/2011/03/18/deficit-cut-danger-budget-jobs-leadership-managing-employment\_2.html

The second fundamental difference between a household budget and that of the federal government is that the former does not have the means or responsibility to stimulate the macroeconomy to the point that it employs all willing workers. This is an absolutely key point that has been almost entirely ignored. As technology allows us to become increasingly productive, it creates a cruel irony. On the one hand, we develop the capacity to produce more sophisticated and efficient products for all of us to enjoy. On the other, we are able to do so by employing fewer and fewer people. Those without jobs, even though they are willing to work, must go without despite the fact that we have the capacity to meet their demand. If the government did not act to supplement this, then we would find ourselves in a constant state of poverty amid the capacity for plenty--just as we did in the Great Depression (and as we do to a lesser extent right now). The market **can't correct this on its own**. We have no right to expect entrepreneurs to hire more workers than they need or consumers to buy more televisions than they want. Entrepreneurs' goal is to find low-cost ways to satisfy consumer demand, not generate a jobs for all those who want one. The federal government, however, is in a **perfect position** to do this, and when it does so it is a **net gain for everyone**. Say it takes an unemployed worker and makes him a soldier. As already explained, paying him requires neither a borrowing nor additional taxation (indeed, the latter would be counterproductive, just as cutting expenditures is right now). The government could create new money and the result would be an increase in income for everyone, including those in the private sector. Those who had already been employed would give up nothing. They'd be able to enjoy the same number of goods and services as before, since we were never at full capacity. Plus, they'd now have all that and protection against foreign aggression. The soldier would obviously be better off, since he'd now have money in his pocket and be able to buy the goods and services society was always able to produce. And entrepreneurs would get higher sales, which they obviously like, and might even find it necessary to hire more workers to meet the new demand. All net gains, every single one, because the economy was at less than full employment--a place where the market system tends to leave us. A secondary lesson here is that not only can the federal government spend in deficit forever, but it **must do so** if the private sector is to reach its full potential. Deficits raise the level of private wealth while surpluses, representing as they do an excess of government taxation over spending, necessarily drain wealth from private citizens and firms. It is no coincidence that the Clinton surpluses coincided with massive increases in private-sector debt. It's simple math. The government is not a household, and you cannot apply the same logic without disastrous consequences. We went through this same debate in the 1930s, and it was only settled by Pearl Harbor, when suddenly deficits that put our present one to shame were viewed as absolutely right and just--and the economy hardly collapsed then or in the postwar era.

## Economy Advantage – Spending Good – Economy

### Government spending solves the economy

**Krugman 8.** (Paul, PhD in from MIT. Nobel Laureate and worked at the White House Council of Economic Advisors. “Deficits and the Future.” December 1, 2008) http://www.relooney.info/0\_New\_3992.pdf

One more thing: Fiscal expansion will be even better for America’s future if a large part of the expansion takes the form of public investment — of building roads, repairing bridges and developing new technologies, all of which make the nation richer in the long run. Should the government have a permanent policy of running large budget deficits? Of course not. Although public debt isn’t as bad a thing as many people believe — it’s basically money we owe to ourselves — in the long run the government, like private individuals, has to match its spending to its income. But right now we have a fundamental shortfall in private spending: consumers are rediscovering the virtues of saving at the same moment that businesses, burned by past excesses and hamstrung by the troubles of the financial system, are cutting back on investment. That gap will eventually close, but until it does, government spending **must take up the slack**. Otherwise, private investment, and the economy as a whole, will plunge even more. The bottom line, then, is that people who think that fiscal expansion today is bad for future generations have got it exactly wrong. The best course of action, both for today’s workers and for their children, is to do whatever it takes to get this economy on the road to recovery.

## Economy Advantage – Spending Good – AT: China Run on Dollar

### China won’t run – if they do it won’t collapse the economy

-not related to the budget deficit, only the trade deficit

-would hurt their economy, means they won’t run

Harvey 11 – Professor of Economics @ TCU

John Harvey, 3-2011, “The Big Danger In Cutting The Deficit,” http://www.forbes.com/2011/03/18/deficit-cut-danger-budget-jobs-leadership-managing-employment\_2.html

There is also a great deal of confusion regarding the role of China in financing the national debt. First, as already mentioned, there was never any economic reason to sell Treasury bills to China. If China and everyone else on the planet decided tomorrow that they didn't want any more, there is no reason why that must act as a constraint on federal spending. We could simply sell the debt directly to the Federal Reserve for the necessary cash (as stated earlier, that's not strictly permitted under current rules, but there's no economic reason not to do it). Second, if China were to suddenly want to "cash out," which for a variety of reasons it is **exceedingly unlikely to do**, we could easily pay it back with the dollars that we are legally permitted to create. It was already explained above why this is not inflationary, besides which the new money would be in China. And if it caused the dollar to depreciate (which is far from a certainty), then that would increase our exports and decrease our imports--one of the many reasons China would be reluctant to do it! But third and most fundamentally, the debt owned by China is a function of our trade deficit with that country, not of the federal budget deficit. Even if the latter were in surplus, we would still owe as much to China as we do right now. When we import more from China than we export to it, it ends up with a surplus of cash.

## Economy Advantage – Spending Good – Employment

### Only government investment can guarantee employment

Harvey 11 – Professor of Economics @ TCU

John Harvey, 6-2011, “How to Destroy the US Economy? Balance the Budget,” http://blogs.forbes.com/johntharvey/2011/06/05/how-to-destroy-the-us-economy/

How the Government Can Supplement Employment (and private sector profits) Situations like the 1930s and today benefit no one. Unemployed workers would like jobs, employed workers would like not to have to support (formally or informally) the unemployed, and entrepreneurs would like to sell more output. There is an obvious solution: the federal government can supplement demand. Start off with a simple example: just imagine that they pay people $30,000/year to stand on a street corner and make nice comments about passers by to raise national morale: “My, don’t you look handsome today!” “Go get ‘em, tiger!” “You’re important and people like you!” While this may make the others feel uncomfortable and cause them to avoid these particular street corners, it is nevertheless a net addition to aggregate demand. This is so because when these public greeters go home from work, they spend money from their incomes. This takes nothing from the mouths of existing workers because we already had the ability to produce more (again, compare the Roaring Twenties with the Great Depression). On top of that, the formerly unemployed now have jobs plus the ability to purchase goods and services and entrepreneurs earn more income because their sales rise–everyone is better off. Now let’s make the example a little more realistic and actually give the government employees something useful to do (but not necessarily profitable, since that’s what the private sector already does). Instead of street corner greeters, they could be soldiers, airmen, sailors, marines, librarians, teachers, police officers, firemen, social workers, national park rangers, et cetera. This adds even more to the nation’s wealth because now even the formerly employed enjoy more goods and services (for example, protection from domestic and foreign aggression and a place to go camping). Remember, the core economic problem is the private sector’s inability to generate sufficient demand to employ everyone. This solves it by supplementing demand. It creates **more employment, higher wages, and greater profits**. How the Government can Finance its Spending Whence comes the money the government uses to pay the soldiers, airmen, sailors, marines, librarians, teachers, police officers, firemen, social workers, and national park rangers? It could tax the private sector, but that’s not terribly effective since it raises demand in one place by lowering it in another. **So, they should deficit spend**. To keep with my desire for simplicity in this entry, let’s say the manner in which this is accomplished is direct borrowing from the Federal Reserve (something that is illegal at the moment but can be, and is, done via a less direct route). This means the Treasury sells its debt to another branch of the government, in exchange for which it receives the cash it needs to pay those workers. When the debt becomes due, they sell more. Because all US debt is owed in a currency we are legally permitted to print, it is impossible to face debt default. We can choose to default, but we are never forced to. Nor is this inflationary. This is true for a variety of reasons, the most critical of which being that it does not represent more money chasing fewer goods since the quantity of the latter rose–that was the whole point of the exercise. We wanted to lower unemployment and produce more output. I have, incidentally, two longer entries on how inflation really works: Money Growth Does Not Cause Inflation! What Actually Causes Inflation (and Who Gains from It) Conclusions That’s the essential story in as few words as I can tell it. For those who are more visual, several months ago a friend of mine used one of my blog posts to make this YouTube explanation of the core issues: The bottom line is that the private sector **does not generate sufficient demand** to hire all those who are willing to work. The real irony is that we have plenty of capacity to produce output for them, they just can’t afford to buy it. But, if we supplement this with public sector deficit spending–something we can finance forever since the debt is owed in our own currency–then this absolutely, totally unnecessary problem **can be solved**. To do the opposite, to lower government spending (or raise taxes) in the midst of a period of high unemployment, is not only counterproductive, it’s cruel. The federal government does not borrow in order to be able to afford something it could not otherwise buy. Rather, the goal of deficit spending (at least when we are at less than full employment) is to stimulate demand. This is not analogous to how a household budget works.

## Economy Advantage – Spending Good – AT: Public vs. Private

### Public spending doesn’t deter private sector investment

Harvey 11 – Professor of Economics @ TCU

John Harvey, Professor of Economics @ TCU, 6-2011, “Why You Should Learn to Love the Deficit: Federal Budget Fallacies,” http://blogs.forbes.com/johntharvey/2011/07/02/learn-to-love-the-deficit/

This is where the government can play a useful, indeed vital, role. They can supplement demand by employing the unemployed as soldiers, sailors, airmen, marines, teachers, firemen, police officers, etc. Because we started at a point of less-than-full capacity, private sector workers give up nothing, entrepreneurs earn extra profits, and it creates a series of non-market services (national defense, fire protection, education, etc.). It is truly a win-win situation, which is possible when we have idle resources. And the funds to finance these activities should come from deficit spending. There is no point in taxing away spending power from the private sector in order to create demand from the government. That’s self-defeating. This is the essential role that **only the government can play**, for only it can create demand from thin air. There is no other alternative if we want capitalism to survive. Should we seek to limit government power? Absolutely, just as much as we should do so with those mega-corporations that are dominating the private sector. But a modern capitalist economy without **public sector demand will fail.**

### Their evidence assumes full employment

Harvey 11 – Professor of Economics @ TCU

John Harvey, 4-2011, “Obama + Ryan = Catastrophe,” http://blogs.forbes.com/johntharvey/2011/04/11/obama-ryan-catastrophe/

Along similar lines, there are those who argue that government sector spending crowds out the private sector and that as we reduce the former, so the latter will fill the gap. What you have to understand is that the logic of those models is based on the idea that we are already at full employment, that there aren’t any unemployed laborers available who could come to work for your business unless the government laid some off. Right now, there are around 13.5 million unemployed workers, so no worries there and **no crowding out**. In summary, the arguments that lowering spending and/raising taxes will boost the private sector are false.

### There’s no tradeoff – the private sector is *choosing* not to invest in valuable markets now

Harvey 11 – Professor of Economics @ TCU

John Harvey, Professor of Economics @ TCU, 6-2011, “Why You Should Learn to Love the Deficit: Federal Budget Fallacies,” http://blogs.forbes.com/johntharvey/2011/07/02/learn-to-love-the-deficit/

POPULAR FALLACIES (in no particular order) When the government spends in deficit, that means I am being taxed more: I’ve heard this one numerous times and it’s very obviously false–the fact that you are not being taxed to cover the spending is WHY it’s a deficit! If taxes were rising along with the spending, then it would be a balanced budget. Does it mean taxes may rise in the future? It shouldn’t. In fact, if the deficit does what it’s supposed to, then the economy grows and the deficit automatically shrinks (as tax revenues rise and government spending for unemployment and income assistance falls). Cutting the deficit by reducing spending puts money in my pocket: This ignores the fact that a) you weren’t being taxed to finance the deficit in the first place (or it wouldn’t have been a deficit) and b) government spending is money in someone’s pocket. Thus, cutting the deficit by reducing spending removes money. This is true even if you are in the private sector, since those government employees bought groceries, paid rent, went to the mall, etc., etc. They earned income for you by buying what you sell. You can’t spend your way out of a recession: Of course you can. We did it in the Great Depression, Reagan did it, and it’s what we should be doing right now (instead of bailing out the financial industry, wasting time with Quantitative Easing, and trying to balance the budget). Why this works should be obvious from the backdrop offered above. Businesses will regain confidence, consumers will spend, and banks will loan. So, yes, you can spend your way out of a recession because a recession is caused by lack of spending. Cutting government spending frees up resources for the private sector to grow: It might do so if we were already at full employment and using all our productive capacity. However, in the midst of the worst recession since the Great Depression, this argument holds no water whatsoever. We have plenty of idle resources, the private sector is **simply choosing not to employ them**. There is no need to free up something that is already in excess supply. Nor is there some web of regulations and taxes that is preventing recovery. The past thirty years has been a **continuous deregulation** of our economy and effective tax rates as a low as they have been since before World War Two.

## Economy Advantage – Spending Good – AT: Inflation

### Doesn’t lead to inflation – only with full employment

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POPULAR FALLACIES (in no particular order) When the government spends in deficit, that means I am being taxed more: I’ve heard this one numerous times and it’s very obviously false–the fact that you are not being taxed to cover the spending is WHY it’s a deficit! If taxes were rising along with the spending, then it would be a balanced budget. Does it mean taxes may rise in the future? It shouldn’t. In fact, if the deficit does what it’s supposed to, then the economy grows and the deficit automatically shrinks (as tax revenues rise and government spending for unemployment and income assistance falls). Cutting the deficit by reducing spending puts money in my pocket: This ignores the fact that a) you weren’t being taxed to finance the deficit in the first place (or it wouldn’t have been a deficit) and b) government spending is money in someone’s pocket. Thus, cutting the deficit by reducing spending removes money. This is true even if you are in the private sector, since those government employees bought groceries, paid rent, went to the mall, etc., etc. They earned income for you by buying what you sell. You can’t spend your way out of a recession: Of course you can. We did it in the Great Depression, Reagan did it, and it’s what we should be doing right now (instead of bailing out the financial industry, wasting time with Quantitative Easing, and trying to balance the budget). Why this works should be obvious from the backdrop offered above. Businesses will regain confidence, consumers will spend, and banks will loan. So, yes, you can spend your way out of a recession because a recession is caused by lack of spending. Cutting government spending frees up resources for the private sector to grow: It might do so if we were already at full employment and using all our productive capacity. However, in the midst of the worst recession since the Great Depression, this argument holds no water whatsoever. We have plenty of idle resources, the private sector is simply choosing not to employ them. There is no need to free up something that is already in excess supply. Nor is there some web of regulations and taxes that is preventing recovery. The past thirty years has been a continuous deregulation of our economy and effective tax rates as a low as they have been since before World War Two. The debt has never been this large: The proper measure of the size of the debt is relative to the size of the economy. Gross Domestic Product is typically used as the gauge of the latter. Even the most extreme measures of where it stands today puts debt/GDP at less than 100%. It reached it peak during WWII, when it was around 120% of GDP. The 1950s were , incidentally, hardly a period of economic Armageddon. We have largest debt in the world: According to the CIA Factbook, as of 2010 we ranked 37th. That put us behind the world average, Spain, The Netherlands, Austria, the UK, Israel, Germany, Portugal, France, Ireland, Belgium, and Japan. The debt must be repaid: We must, of course, meet the “monthly payments,” but the level of debt need never be zero. The government has an infinite life span, so there is no day of reckoning when all debts must be settled. And since the debt is owed in dollars, there is never any question that we have the ability to repay since we are allowed to issue brand new ones at any time. Nor is this necessarily inflationary, as explained in the next fallacy. Deficit spending could create inflation: Yes, it could, if we were already at full employment (unemployment around 4%). In that case, the government would be competing for resources in an economy where no excess existed–that might drive up prices. But we are a **long, long way** from that right now. Furthermore, inflation is a far more complex phenomenon than most people understand. For more on how inflation really works, see here: Money Growth Does Not Cause Inflation And here: What Really Causes Inflation

# \*Resource Extensions

## Uniqueness – Energy Consumption Increasing

### Energy consumption will increase exponentially – leads to resource peaks

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

There is now a tremendous need (and indeed for the remainder of this century) for the identification, development and deployment of new energy sources. This need is driven strictly by the demographics of Earth’s rising population. However, the technological approaches that are employed to meet that economically driven demand for energy will directly determine the potential climate impact (i.e., greenhouse gas emissions) that result. Moreover, there is the increasing likelihood – the timing of which is still uncertain – that the production of key fossil fuels will peak during the coming decades, resulting in further risks to the global economy and quality of life. Future Energy Demand Despite setbacks such as the current recession, economic growth during the coming decades will demand dramatic increases in the supply of energy worldwide – including energy primary heating/cooling, transportation, and especially electrical power generation. 3 Table 1-1 (see below) provides a summary of characteristic current forecasts of future energy and environmental factors that provide the global energy context for the IAA’s consideration of the space solar power option. Forecasts vary widely; however, a baseline would require two-times the level of energy consumption in 2010 by 2030-2040, and four-times that level by 2090-2100. Delivering that huge increase in energy will **require massive** development of new power plants, as well as **new energy sources** for transportation and other needs.

### Resource peaks are inevitable – status quo renewables can’t fill in

Martin et al 11 – Lt. Col. in the USAF

Harold Martin, et al, “Space Based Solar Power” Industry and Technology Assessment, Scholar

Recent studies regarding “peak oil,” the time when the world oil supply reaches its highest volume before it declines, suggest a time frame between now and 2016, and multiple scenarios predict a 10% reduction in production by 2030 [8]. Oil makes up 29% of the current energy supply [9]. While these numbers suggest that oil will decrease at 0.005% per year, its actual decrease will not be gradual, but instead be a **sudden precipitous drop** over the course of only a few years [8], not giving the market enough time to develop a suitable alternative without having a destructive effect on the **global economy**. Coal, also makes up 29% of the current energy supply. “Peak coal” is estimated by academic sources to be reached in the next few years, and have been reduced to 50% of peak values by 2047 [10], though significant technological improvement in mining and refining low quality coal may reduce some of the effects. Producing 25% of the world’s sources of energy, natural gas is the only resource that is not expected to peak until 2020[11]. However, natural gas is not commonly shipped over ocean lanes, leading to a natural gas crisis currently in North America, as domestic (US and Canadian) production is not enough to meet demand, even with the use of environmentally destructive “shale gas” and other unconventional natural gas resources. North American peak natural gas could occur as early as 2013 [12]. Including the widespread use of environmentally destructive practices, North American gas production will only increase by 5% by 2025 [13]. Combining this data with data for total consumption gives us the following table[14]. The projections were all constructed using the standard Hubbert method, after which the overall changes were linearized and then extrapolated to 2025, as shown in the table below. Nuclear and renewables, discounting traditional biomass, currently accounts for 8.8% of the world energy supply. If we assume a low, basic growth in energy demand, by year 2025 there will need to be a 32% increase in energy supply. If we project a loss of 6.7% by 2025 from fossil fuels, there needs to be an amount of 38.7% of the current energy supply that comes from nuclear and renewables. This amounts to an increase of 12.8% per year from nuclear and renewables alone. While on the other hand, a 4% annual increase in energy demand would lead to a necessary 18.5% increase in the renewables and nuclear. Nuclear energy is approximately half the size of the renewable energy sources. Considering the difficulties there are in disposing of nuclear waste, and the recent problems with the nuclear facilities in Japan casting doubt on the safety of nuclear energy, it is **unlikely that nuclear energy** will be able to meet this increased demand. Furthermore, though currently renewable energy is increasing at a rapid rate, of around 20% over the renewables (mainly hydroelectric power) as a whole [14]. This indicates that there needs to be **growth of a new source of energy** in order to match such demand. Furthermore, as supply is not linear, but is instead expected to have sharp changes due to the Hubbert curve, a prepositioned alternative source of energy may have much to gain. According to studies by the United States Energy Information Administration, from 2007 to 2035, world net electricity generation is projected to increase by 87 percent, from 18.8 trillion kilowatt hours in 2007 to 25.0 trillion kilowatt hours in 2020 and 35.2 trillion kilowatt hours in 2035. In OECD countries, where electricity markets are well established and consumption patterns are mature, the growth of electricity demand is slower than in non-OECD countries, where a **large amount** of potential demand remains unmet. Total net generation in non-OECD countries increases by 3.3 percent per year on average, as compared with 1.1 percent per year in OECD nations. Total demand is expected to increase at 2 percent each year. World renewable energy use for electricity generation is projected to grow by an average of 3.0 percent per year and the renewable share of world electricity generation increases from 18 percent in 2007 to 23 percent in 2035.

## Uniqueness / Link

### Human consumption is poised to drastically increase – only space solar power can meet future demands

Johnson et al 9 – NASA Physicist

Les Johnson, NASA Physicist, 2009, Matloff, PhD in Applied Science @ NYU, C Bangs, Artist, Paradise Regained: The Regreening of the Earth, pg. 108-109

According to the United States Department of Energy, the average American household uses approximately 14,000 kilowatt-hours (kWh) per year. A kilowatt-hour is the amount of energy a 1-kilowatt appliance would use if left running for 1 hour. For example, a 100-watt light bulb burning for 1 hour would use 0.1 kWh; if it were left on for 10 hours, it would use 1 kWh. While this is currently far more power per person than that consumed by the citizens of the rest of the world, there is reason to believe that rest of the world's **per capita energy consumption is rising and will continue to rise** in the future as standards of living increase. Burning fossil fuels in automobiles, electrical power plants, or other machines like jet aircraft currently consumes most of this energy. We can convert sunlight directly into electrical power by using a solar cell. Solar cells use quantum mechanical effects to convert some fraction of the sun's energy railing on them to usable electrical power. Earth-based solar cells can be used effectively for applications that do not require a lot of power, like highway road signs and calculators. But if you need megawatts on a continual basis, solar cells are simply impractical in many locations. Terrestrial solar cells can generate power only during the day, only when the sun is not obscured by clouds and rain, and in locations that do not degrade the materials from which they are made. Unfortunately, there is no place on Earth that gets continuous sunlight and never has bad weather. What if you could locate these massive solar array farms in a location that is in almost perpetual sunlight with no cloudy or rainy days? You might have a chance at providing continuous power to an energy-hungry population without directly generating pollutants or emitting greenhouse gases. Then you might have a **power solution worth considering**. **Space provides this optimal location** to generate electricity for a **power-hungry Earth**.

## Link – Energy Independence

### SSP leadership solves energy dependence

Shea 10 – MA in Public Policy from GWU

Karen Shea, 12-2010, “Why Has SPS R&D Received So Little Funding?,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/shea.html

The **time is now** for the development of space solar power. If the U.S. government commits to it as a matter of public policy, a new SPS industry will emerge, repaying the public investment many times over. If the U.S. does not do so, Japan, China, India or Russia will take the lead in space solar power development and the U.S. will continue to **send billions of dollars a year abroad** to insure that our **energy needs are** **met**.

### US leadership is key to develop the industry and open the door for partnerships

JEN 7

Japan Economic Newswire, “US Report urges space based solar power,” Lexis

The United States should launch a small-scale satellite within 10 years to explore the viability of putting space-based solar power into commercial use by 2050, according to a recently released U.S. report. The recommendations on a project to develop space platforms capable of collecting energy from the sun and transmitting it back to Earth using microwave beams appear in the report compiled by the National Security Space Office, an affiliate of the Defense Department. "Space-based solar power does present a strategic opportunity that could significantly advance U.S. and partner security, capability and freedom of action, and merits significant further attention on the part of both the U.S. government and the private sector," the report said. "In addition to the emergence of global concerns over climate change, **American and allied energy source security** is now under threat from actors that seek to **destabilize or control global energy markets**," it added.

### Specifically – a large US investment turns the US into a net energy exporter

Chapman et al 11 – geophysicist and astronautical engineer who served as a NASA scientist astronaut during the Apollo Program

Phil, March, 2011, <http://solarhigh.org/Overview.html>

The expected cost of deploying SBSP is ~$7,400/kW, including the rectenna as well as construction and launch of Block II satellites. Amortized over an expected life of 30 years at a discount rate of 5%, the contribution of this capital cost to the delivered cost of electric energy would be 5.6 cents/kWh. SBSP is thus much more promising than terrestrial solar as a replacement for fossil fuels or nuclear power. A strong **US commitment** to SBSP could solve the **energy problem permanently**, in the USA and around the world. Offer clean, inexhaustible solar power almost anywhere on Earth. **Restore the status of the United States** as an energy-exporting nation. Create large international markets for export of our technology as well as energy. Offer greatly reduced launch costs to all users of space, including the DoD, NASA and commercial interests. **Restore US preeminence** in launch services. Permit explosive growth in extraterrestrial enterprises. Open the solar system as the domain of our species, eliminating most concerns about resource exhaustion. Serious studies of SBSP are under way in several countries, including Japan, China, India and the European Union. Continued US neglect of this vital technology means that we will not only suffer all the economic, political and strategic consequences of abdicating our leadership in space but also abandon control of our energy future. What we do about these issues in the next few years will determine whether we will restore American initiative or become a **debt-ridden, second-rate nation that must import electricity as well as petroleum.**

## Link – Energy Exporter

### Plan makes the US a net energy exporter

Nansen 2k

Ralph, President of the Solar Space Industries, September 7, 2000, <http://www.nss.org/settlement/ssp/library/2000-testimony-RalphNansen.htm>

Energy demand continues to grow as our population expands. The electronic age is totally reliant on electric power and is creating a new need for electric power. Many areas of the nation are experiencing energy shortages and significantly increased costs. United States electricity use is projected to increase by 32% in the next twenty years while worldwide electric energy use will grow by 75% in the same period. Worldwide oil production is projected to peak in the 2010 to 2015 time period with a precipitous decrease after that due to depletion of world reserves. Natural gas prices in the United States have doubled in the last year as the demand has grown for gas fired electrical generation plants. Global warming and the need for reduction of CO2 emissions calls for the replacement of fossil fuel power plants with renewable nonpolluting energy sources. Even with increased use of today's knowledge of renewable energy sources carbon emissions are expected to rise 62% worldwide by 2020. If we have any hope for a reversal of global warming we must dramatically reduce our use of fossil fuels. Solar power satellite development would reduce and eventually eliminate United States dependence on foreign oil imports. They would help reduce the international trade imbalance. Electric energy from solar power satellites can be delivered to any nation on the earth. The United States could **become a major energy exporter.** The market for electric energy will be enormous. Most important of all is the fact that whatever nation develops and controls the next major energy source will dominate the economy of the world. In addition there are many potential spin-offs. These include: Generation of space tourism. The need to develop low cost reusable space transports to deploy solar power satellites will open space to the vast economic potential of space tourism. Utilize solar power to manufacture rocket fuel on orbit from water for manned planetary missions. Provide large quantities of electric power on orbit for military applications. Provide large quantities of electric power to thrust vehicles into inter-planetary space. Open large-scale commercial access to space. The potential of space industrial parks could become a reality. Make the United States the preferred launch provider for the world.

### More evidence

Foust 08 **–** Jeff, the Space Review editor and publisher, (Jeff ,The Space Review 9/15, http://www.thespacereview.com/article/1210/1)

Such efforts, though, are likely beyond the budgets of the Discovery Channel and other networks (not to mention that doing studies hardly makes for the most scintillating television), requiring funding from other sources, most likely the federal government, which is not currently funding any SSP-related research. A variety of government agencies, Mankins said, could step forward to support this, from the Defense Department to the Energy Department. “The $100 million could come from a variety of places, but the key thing is to have it actually focused on these problems,” he said. “The United States is by far the world’s greatest space power,” said Mark Hopkins, senior vice president of the NSS, “and yet we’re not spending any money in this country on space solar power.” That’s not the case in Europe and Japan, where there is money being spent, if only on a small scale, on SSP. “The situation is ridiculous.” One person working to try and make the case for SSP on Capitol Hill is Paul Rancatore. Earlier this year Rancatore ran for Congress from Florida’s 15th district, in the state’s “Space Coast” region and home to many people who work at the Kennedy Space Center. Rancatore made mention of SSP in his campaign, calling it “an economic generator not seen since the Apollo program” and winning the endorsement of Apollo 11 Buzz Aldrin. However, he lost the Democratic primary last month. Rancatore is now spending time meeting with members of Congress and their staffs, primarily with the House Committee on Energy and Commerce and the Select Committee on Energy Independence and Global Warming, on the issue of SSP. “Energy is probably the biggest issue facing the country as well as the world,” he said, requiring both short- and long-term solutions. SSP, he said, solves three major issues in the US today: employment, particularly in high-technology areas; energy independence; and foreign policy. Right now, Rancatore said he’s working to “educate members about what space-based solar power can do for our country, create that dialogue, and possible create a ‘space-based solar caucus’ within Congress for them to fully understand the ramifications for our country and the world and start get members involved.” In an interview after the press conference, he said he’s met with Congressman Ed Markey (D-MA), who chairs the global warming committee, about this issue. Rancatore said he’s yet to identify a member willing to champion this issue in Congress, but expects to make progress on that front, including establishing the caucus, when a new Congress convenes in January. He added that he’s reached out to the campaigns of John McCain and Barack Obama on this subject as well. Some of that rhetoric being used to win over members of Congress was trotted out at the press conference as well. “The potential of space solar power is so large that, if it works out, it would transform the American economy to a much greater extent than the auto industry did in the early part of the 20th century,” said Hopkins, who added that SSP could allow the US to stop spending hundreds of billions of dollars a year to import energy, some of it from countries unfriendly to the US. That’s the long-term goal, but for now the focus is on near-term incremental progress. “What we think we’ve done is to demonstrate that progress is possible,” Mankins said. “It’s possible in a short time and it’s possible at a reasonable budget.”

## Link – US Key – Environment Aff

### \*\*\*Don’t read w/ aerospace\*\*\*

### Only the US solves

Davidson 10 – Compilation of notes from an interview with Gary Spirnak, and Al Globus

Christopher, 5/12/2010, <http://spot.us/pitches/445-is-solar-power-from-space-the-next-big-thing-in-green-energy/updates/433-notes-on-my-interview-with-gary-spirnak-ceo-of-solaren-space>, “[Notes on my interview with Gary Spirnak, CEO of Solaren Space](http://spot.us/pitches/445-is-solar-power-from-space-the-next-big-thing-in-green-energy/updates/433-notes-on-my-interview-with-gary-spirnak-ceo-of-solaren-space)”

At geostationary orbit, one 1000 MW plant can reach a third of the Earth's surface. Nothing prevents us from sending power all over the world. However, we are a United States company, and what we're doing-- producing -- **can ONLY be done here**. **US** **aerospace alone has the industrial capability**. Other countries want to do it too, but **they can't do it**, not now anyway, because they **don't have the US aerospace industry**. We (in the United States) have the chance to **be dominant in this industry**. It's the aerospace industry's market to lose. We're not asking for investors from aerospace, but only for contracts. We want stuff built to our specific ations. Once we've built these 1000 MW plants, say 20 to 30 plants, we'll get revenue off of them for the next 30 years -- we can predict the revenues and the costs -- what you have to do with a public offering -- factor value of product and divide it over the years, etc. and bring it back to the present. Besides building big, we have to think big. 1000 megawatts of power will generate more than $1 billion profit a year. The entire generating capacity of the United States is 1000 gigawatts, and it's projected to grow to 1300 gigawatts by 2030. The market is still growing throughout the world, and we have investors throughout the world. These are tough things to do -- lots of pitfalls, but we're confident we'll be able to work them out. We're not doing new science, we're not inventing new devices -- just rearranging and enlarging the technology that already exists. 30 to 40 years ago we couldn't have done it because the solar technology wasn't there yet. If the solar technology improves, we don't have to replace parts, we can just launch new satellites. If you design for the space environment, it's a relatively benign place to be -- if you have primary systems, backup systems, etc. Our business plan is showing investors how we'll get from A to B. I'm not saying some one else can't do what we're doing with lasers -- that's just not what we decided to do. But we have to raise billions of dollars so we went with a proven technology. The United States has a real opportunity to get a **jumpstart** on **an entire new industry**. We can keep building 1000 MW plants, and expand over time, we can probably put as many of them as we want in orbit, and it still won't be enough. It's going to be an exciting year for us. QUOTE FROM AL GLOBUS: Finally got around to looking at their patent (http://www.google.com/patents?id=YEcVAAAAEBAJ&printsec=abstract&zoom=4&source=gbs\_overview\_r&cad=0#v=onepage&q&f=false), can't believe I didn't do this a long ago. big elements, solar collection and final power transmission, are thin film and weigh very little. The solar collection is done by a mirror, probably with no more than a few g/m2 for the material. They solved the antenna size problem elegantly -- the transmitter is small and directed at a large mirror, also thin film, so the Earth antenna sees a large thing. Your interest in pursuing this story has inspired SSI to make a list of trusted references and resources, so we'll be providing that to you shortly. On the other side of the coin, you may want to look into claims by Space Island Group and Welsom Corporation about space solar power business plans. SSI's leadership concurs with the conclusions of the Pentagon study. It will take **government investment** into basic infrastructure and technology risk retirement to make **space solar power viable**. I urge you to read the full report - you can find it here by clicking on the link to Interim Assessment .. <http://spacesolarpower.wordpress.com/2007/10/10/sbsp-interim-assessment-release-01-is-published/>

## Link – SSP Solves

### Plan solves energy wars

Smith 8 – Colonel, PhD Candidate @ Reading in UK

Colonel M.V. Smith, PhD student in the strategic studies program under Professor Colin Gray at the University of Reading in the UK, former Chief of Future Concepts (Dream Works) for the National Security Space Office at the Pentagon, ““Why is the DoD interested in this?” Security at all levels!,” http://spacesolarpower.wordpress.com/2007/09/01/why-is-the-dod-interested-in-this-security-at-all-levels/#more-58

Yesterday at one of my alternate work locations (okay…another one of D.C.’s Irish pubs) a space skeptic asked me to write down all the security reasons that explain why the DoD is interested in space-based solar power. Fair enough. So this is what I wrote on the bar napkin: (I share it with you because that’s what I do!) Immediate military tactical and operational needs: Dramatically reduce the energy logistics train to forward operating bases and reduce the need to secure massive energy convoys and stores in: Disaster relief efforts Nation building efforts Combat zones Beam power directly to vehicles in all operating media for the following reasons Reduce weight of carrying fuel Increase range and loiter time Eliminate need for refueling and reduce the need for refueling vehicles Reduce the need for consuming local energy supplies Reduce size and signature Use SSP for liquifaction of carbon-neutral fuels for current generation of liquid-fueled systems Continue to exploit current liquid fuel infrastructure, using carbon neutral fuels Gain independence from foreign liquid fuel providers Urgent national security strategic goals: Assist in achieving national energy independence from current liquid fuel providers Reduce level of national interest in unstable regions Reduce national dependence on unfriendly foreign governments Reduce the risk of energy competition wars in the 21st Century Assist allies in achieving their national energy independence Develop and strengthen broad international partnerships Participate in international energy consortia and alliances Economic: Become an energy exporter Increase national ability to influence or avoid geopolitical events Increase GNP, wealth of the nation, and increase tax revenue Use energy earnings to pay off national debt Environmental: Dramatically reduce carbon emissions into the atmosphere Prevent food wars which might happen if global warming continues Enhance soft power and green credibility around the world Lead the international clean energy movement by example So you can see, this is a disruptive technology for security operations, but far more importantly, it will redefine geopolitical relationships and **removes energy competition** **as the major driver for wars**. Personally, I think war prevention is the highest form of security.

## Link – No Other Solves

### No present technology can limit the impact of mass consumption

-must drastically increase renewable energy in this century to prevent the worst impacts

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

It is crucial for the world to identify, research, develop, demonstrate, commercialize and deploy affordable and sustainable new energy sources. This need is driven by various factors; three of the most important are: (1) demand for energy to enable economic growth for a still-increasing global population, (2) concerns regarding the long-term accumulation in Earth’s atmosphere of fossil fuel-derived greenhouse gases, and (3) the prospect that during the coming decades annual production of petroleum (and possibly other fossil fuels) will peak and begin to decline. Continuing economic progress will require a four-fold increase in annual energy use by the end of the century. If carbon dioxide (CO2) emissions into the atmosphere are to be constrained during the same span, by 2100 some 90% of all energy used must be from renewable or nuclear sources. Notwithstanding optimistic claims to the contrary, it **does not appear that there is at present a solution** to these concurrent challenges.

## Impact – Trade Deficit

### SPS independence *eliminates* the trade deficit

Broadus 11 – Former Professor of Law @ GMU

Joseph Broadus, 2011, “Energy Independence Must be a National Priority,” http://www.redcounty.com/content/energy-independence-must-be-national-priority

Staggering oil price hikes have once again led Americans to question our national energy policy with particular emphasis on reliance on imports. For me, one thing is certain. A cornerstone of any national energy policy must be energy independence. U.S. energy self-suffciency is not just an option but a **necessity** which needs top priority. A recent Congressional Research Service study revealed that the United States has twice the energy resources of any other nation, and leads the world in energy potential. We have the means to meet our needs. Yet, the United States imports about a quarter of its energy requirement at staggering costs. The cost of imported energy is about $500 billion dollars. That's half a trillion dollars bleeding out of the country every year. That's perhaps million of lost American jobs, and substantial loss of tax revenue to cash starved states and the federal government. If one considers the question of velocity, the problem looms even larger. Velocity is the idea that a dollar spent results in subsequent rounds of spending. Bringing a new payroll dollar into a community or country results in much higher levels of expenditures as that initial dollar moves through the economy in subsequent transactions. The real lost to our economy than is not just the dollars going out, but the transactions that are never made. Energy imports are a breeder reactor for economic woes. For example energy imports are a **critical factor in the trade deficit.** Understand, that if energy imports were removed from the trade accounts the U.S. would be **at or near balanced trade**.

## Impact – Trade Deficit – Protectionism

### Large trade deficit with China has led Congress to favor protectionism bills

**NYT 10** (“Return of the Killer Trade Deficit” August 16, 2010. New York Times. <http://www.nytimes.com/2010/08/16/opinion/16mon1.html>) AK

The world economy is falling back on very dangerous habits. The United States is tentatively emerging from recession but is still at risk of another dip. Yet trade statistics released last week indicate that American consumers are sucking in large quantities of imports as spending recovers, while weak demand in the rest of the world is crimping American exports. Meanwhile, China is mopping up demand everywhere you look with its artificially cheap supply of goods. Germany, the world’s other exporting power, is cutting its budget and relying on foreign demand to drive its economic rebound. This isn’t sustainable. The bulging American trade deficit means that rising consumer demand is flowing to suppliers overseas rather than fueling growth at home. The American economy is too weak to carry this load. The recent trade data led economists to slash growth estimates for this year. For the global recovery to continue, domestic demand must revive around the world. Other leading countries must do more to stimulate their own demand. And China cannot keep hogging the global export market. The numbers are staggering. The United States trade deficit ballooned to $49.9 billion in June, the biggest since October 2008. In July, one month later, China recorded a $28.7 billion trade surplus, the biggest since January 2009. In the first five months of the year, Germany’s trade surplus, driven in large part by demand for machine tools in recovering Asian economies, rose 30 percent compared with 2009, to about $75 billion. Unsurprisingly, data from both sides of the oceans mesh: the United States’ bilateral deficit with China rose 17 percent in June, to $26.2 billion — the biggest in 40 months. It rose 5 percent with Germany, to $3 billion. The pattern underscores big problems with the mix of economic policies around the world. As Germany and other rich countries in Europe start slashing their budgets and the world economy slows, the United States — beleaguered as it is — has been left as a lone source of demand growth. Meanwhile, Beijing’s reluctance to end an economic strategy based on cheap exports is cementing its position as the world’s demand hog. There are bad ways to address this problem. Punish China rumblings are back on Capitol Hill, but any move to slap punitive tariffs on Chinese goods could lead to destructive tit-for-tat retaliation. The drive by Congressional Republicans to end the Obama administration’s sensible (and still too weak) stimulus policies might help cut the trade deficit — but only by tipping the economy back into recession. There is a proper approach to this rising threat. Chinese leaders have to finally rebalance their economy and rely more on internal demand and less on exports. The central bank announced in June that it would allow China’s currency to start inching up against the dollar — but it has risen less than half a percent. China must deliver. Rich economies with big trade surpluses and the ability to sustain budget deficits — most notably Germany — need to spend more, not less, at home and abroad. After the risk of recession has receded, the United States must work to correct its longstanding trade deficit with the world by slowing national spending and increasing savings. But there will be no recovery — here or around the world — unless all of the major economic players do more to bolster demand right now.

**Trade deficit will push Congress to create China-bashing bills**

Scissors 10(Derek Scissors, Research Fellow on Asian Economic Policy at the Heritage Foundation. “One Step Closer to Trade Sanctions Against China”. The Foundry at the Heritage Foundation. June 7, 2010. http://blog.heritage.org/2010/06/07/one-step-closer-to-trade-sanctions-against-china/)

Tick, tick, tick — the sound of a **Congressional trade bomb**. By its own, not very exacting standards, Congress has patiently waited for change in Chinese currency policy. The single most likely time for that was the G-20 finance minister’s over the weekend in South Korea. [But nothing meaningful from Beijing](http://www.nytimes.com/2010/06/06/business/06summit.html?src=busln). Again. From now until summer recess, Congress likely will be working toward punishing China. The frustration is understandable. The U.S. has played the indispensable role in rapid Chinese economic development, if for our own reasons. We’ve received cheaper goods and a check on inflation and China has received millions of its best jobs. The combined Sino-American trade deficit over the past 30 years is roughly $2 trillion. Most of that is held in U.S. bonds, but it’s still China’s money — money that could be earned from American consumers and no one else. In return, [the PRC is uncooperative on North Korea, Iran, military-to-military contact and a host of other security issues](http://www.heritage.org/Research/Reports/2010/06/US-China-Cooperation-Strengthening-the-US-Hand). This is not surprising. What’s surprising is Beijing won’t even throw the U.S. a bone on most economic issues. The yuan has become a symbol of Beijing’s willingness to cooperate.

### China bashing bill will kill our economy – empirically proven

Scissors 10(Derek Scissors, Research Fellow on Asian Economic Policy at the Heritage Foundation. “How to Cause Another Depression? Anyone? Anyone?” The Foundry, Heritage Foundation. September 23, 2010. <http://blog.heritage.org/2010/09/23/how-to-cause-another-depression-anyone-anyone/>) AK

An ugly financial bubble bursts. A misguided U.S. Congress responds by blaming foreigners and passes [a trade bill](http://en.wikipedia.org/wiki/Smoot%E2%80%93Hawley_Tariff_Act) that prompts widespread retaliation and exacerbates the initial popping of the bubble. That was 1930 and the Great Depression. Fast forward 80 years. An ugly financial bubble has burst and the U.S. Congress—having already failed with trillions in deficit spending—is now blaming foreigners. A bill in front of the House Ways and Means Committee ([and scheduled to be sent to the House floor next week](http://www.washingtonpost.com/wp-dyn/content/article/2010/09/22/AR2010092206277.html)) blames Chinese exchange rate policies for the loss of American jobs. In retaliation, it goes back to the start of the Great Depression and adds yet more protectionist measures to the Tariff Act of 1930, because the first one didn’t do enough harm. In 1930, Congress thought it could solve America’s economic problems by punishing foreigners and was tragically wrong. The same misguided logic is being applied to China now. Proponents of the current bill claim we’re losing jobs due to the overall trade deficit, that the overall trade deficit is driven by our trade deficit with China, and that our trade deficit with China is driven far higher by the exchange rate. [Each part of this is analysis is wrong](http://www.heritage.org/research/reports/2010/09/targeting-the-yuan-a-feel-good-but-futile-response). At least one aspect of trade is simple: what the bigger partner does matters more. The American economy is three times larger than the Chinese economy—our policies drive the trade deficit much more than theirs do. Even on the Chinese side, the Chinese government intervenes in the economy in many unfortunate ways, not just through the exchange rate. Changing the exchange rate alone will do almost nothing to change U.S.-China trade. If this bill did shrink the U.S.-China trade deficit, it wouldn’t shrink the overall American trade deficit. Countervailing duties or other actions can make China-based production more expensive but they can’t move the production here. Production of clothes, of furniture, and toys can be forced out of China, but will go to India, Vietnam, and other low-cost areas. So will final assembly of advanced items such as computers. The trade deficit with China would shrink but the trade deficit with a dozen other countries would grow. Finally, the connection between the trade deficit and jobs is not what many Members of Congress seem to think. The overall U.S. trade deficit was at its highest in 2006, and unemployment was 4.6 percent. In 2009, the deficit was half its former size but unemployment had doubled. The American economy runs on consumers. Consumer spending creates jobs and increases imports, as well as the trade deficit. The trade deficit comes with high employment, not lost jobs. The final form of the bill is unclear. It could give the Department of Commerce discretion to be selective or be closer to mandatory, across-the-board tariffs. What it will not do is create American jobs. Congress is heading down the wrong path. Again.

### US protectionism bills kill US-China relationship

Business Report 7 (“Trade War Looms over US China”, May 28, 2007. <http://www.busrep.co.za/index.php?fArticleId=3853174&fSectionId=552&fSetId=662>)

Ties between the US and China could become turbulent as combative US law makers threaten Beijing with punitive trade sanctions that could draw the ire of Chinese leadership. A week of high-level talks in Washington failed to end their biggest dispute, over China's undervalued currency, opening the prospect of a trade war between the world's richest and the world's most rapidly growing nations. The Pentagon warned on Friday that cash-flush China was militarising under an opaque budget and that Beijing's ballistic nuclear missiles could now strike the US. The administration of US President George W Bush seems to have taken a more aggressive trade stance, while many in congress discuss passing, not just proposing, anti-China bills. "Previous instances of [US] protectionist rhetoric have ended in little action, but the risks of actual action are a bit higher this time," warned Alec Phillips, a Goldman Sachs analyst. Protectionist sentiment in Washington was high despite low US unemployment and inflation and record equity prices, which would normally stymie such sentiment. "This raises two risks," Phillips warned. "First, the Congress, which has become increasingly hostile towards trade, could impose policies that could sour the US-China economic relationship. Second, a softer labour market, in particular, might raise tensions beyond their already elevated levels [yesterday]." Talks led by Chinese vice-premier Wu Li and US treasury secretary Henry Paulson, as well as subsequent discussions between the Chinese leader and US members of congress, failed to end concerns over the yuan. Law makers said China undervalued the yuan, making US-bound exports cheaper and fuelling the US-China trade deficit, at $232.5 billion (R1.658 trillion) last year. Despite heavy dependence by the US on China, some law makers want trade sanctions, including a possible 20 percent across-the-board tariff on Chinese goods. Anti-China trade bills that were being drafted in congress "could ultimately disrupt bilateral trade flows and, more importantly, capital inflows from China", warned Joseph Quinlan, a Bank of America strategist. Reportedly, two-thirds of China's $1.2 trillion in reserves are in assets denominated in US dollars, including $420 billion in US Treasury bills. – AFP Beijing bourse nears boiling point Shanghai - Experts in China and abroad warned last week of an imminent contraction in the Asian giant's roaring stock markets but defiant investors remain confident that the market knows best. "The market will seek its own balance and correct itself," said Yan Li, an analyst with Chinalion Securities in Beijing. "The government should do nothing to interfere," she said, adding that it was increasingly difficult for China's regulators to influence a market that has tripled in value to about $1.6 trillion (R11.4 trillion) since 2005. The once-marginalised bourse, with a market capitalisation that is merely 2 percent of the $2.3 trillion A-share market, is seeing sharper rises now but it may spearhead any future correction. The week's broader market advance came despite warnings from former US central banker Alan Greenspan and the Organisation of Economic Co-operation and Development, a global group helping states tackle economic challenges, that current prices were unsustainable.

**US China relations are key to solve every global impact**

Cohen 2009 - former U.S. secretary of defense [Maurice R. Greenberg is chairman and CEO of C.V. Starr & Co., Inc. “Smart Power in U.S.-China Relations,” pg online @ http://csis.org/files/media/csis/pubs/090309\_mcgiffert\_uschinasmartpower\_web.pdf //ef)

The evolution of Sino-U.S. relations over the next months, years, and decades has the potential to have a greater impact on global security and prosperity than any other bilateral or multilateral arrangement. In this sense, many analysts consider the US.-China diplomatic relationship to be the most influential in the world. Without question, strong and stable U.S. alliances provide the foundation for the protection and promotion of U.S. and global interests. Yet within that broad framework, the trajectory of U.S.-China relations will determine the success, or failure, of efforts to address the toughest global challenges: global financial stability, energy security and climate change, nonproliferation, and terrorism, among other pressing issues. Shepherding that trajectory in the most constructive direction possible must therefore be a priority for Washington and Beijing. Virtually no major global challenge can be met without U.S.-China cooperation. The uncertainty of that future trajectory and the "strategic mistrust" between leaders in Washington and Beijing necessarily concerns many experts and policymakers in both countries. Although some U.S. analysts see China as a strategic competitor—deliberately vying with the United States for energy resources, military superiority, and international political influence alike— analysis by the Center for Strategic and International Studies (CSIS) has generally found that China uses its soft power to pursue its own, largely economic, international agenda primarily to achieve its domestic objectives of economic growth and social stability.1 Although Beijing certainly has an eye on Washington, not all of its actions are undertaken as a counterpoint to the United States. In addition, CSIS research suggests that growing Chinese soft power in developing countries may have influenced recent U.S. decisions to engage more actively and reinvest in soft-power tools that have atrophied during the past decade. To the extent that there exists a competition between the United States and China, therefore, it may be mobilizing both countries to strengthen their ability to solve global problems. To be sure, U.S. and Chinese policy decisions toward the respective other power will be determined in large part by the choices that leaders make about their own nations interests at home and overseas, which in turn are shaped by their respective domestic contexts. Both parties must recognize—and accept—that the other will pursue a foreign policy approach that is in its own national interest. Yet, in a globalized world, challenges are increasingly transnational, and so too must be their solutions. As demonstrated by the rapid spread of SARS from China in 2003, pandemic flu can be spread rapidly through air and via international travel. Dust particulates from Asia settle in Lake Tahoe. An economic downturn in one country can and does trigger an economic slowdown in another. These challenges can no longer be addressed by either containment or isolation. What constitutes the national interest today necessarily encompasses a broader and more complex set of considerations than it did in the past As a general principle, the United States seeks to promote its national interest while it simultaneously pursues what the CSIS Commission on Smart Power called in its November 2007 report the "global good."3 This approach is not always practical or achievable, of course. But neither is it pure benevolence. Instead, a strategic pursuit of the global good accrues concrete benefits for the United States (and others) in the form of building confidence, legitimacy, and political influence in key countries and regions around the world in ways that enable the United States to better confront global and transnational challenges. In short, the global good comprises those things that all people and governments want but have traditionally not been able to attain in the absence of U.S. leadership. Despite historical, cultural, and political differences between the United States and China, Beijing's newfound ability, owing to its recent economic successes, to contribute to the global good is a matter for common ground between the two countries. Today there is increasing recognition that no major global challenge can be addressed effectively, much less resolved, without the active engagement of—and cooperation between—the United States and China. The United States and China—the worlds first- and third-largest economies—are inextricably linked, a fact made ever more evident in the midst of the current global financial crisis. Weak demand in both the United States and China, previously the twin engines of global growth, has contributed to the global economic downturn and threatens to ignite simmering trade tensions between the two countries. Nowhere is the interconnectedness of the United States and China more clear than in international finance. China has $2 trillion worth of largely U.S. dollar-denominated foreign exchange reserves and is the world's largest holder—by far—of U.S. government debt. Former treasury secretary Henry M. Paulson and others have suggested that the structural imbalances created by this dynamic fueled the current economic crisis. Yet. China will almost certainly be called on to purchase the lion's share of new U.S. debt instruments issued in connection with the U.S. stimulus and recovery package. Secretary of State Hillary Rodham Clinton's February 23.2009, reassurance to Beijing that U.S. markets remain safe and her call for continued Chinese investment in the U.S. bond market as a means to help both countries, and the world, emerge from global recession underscored the shared interest—and central role—that both countries have in turning around the global economy quickly. Although China's considerable holdings of U.S. debt have been seen as a troubling problem, they are now being perceived as a necessary part of a global solution. Similarly, as the worlds two largest emitters of greenhouse gases, China and the United States share not only the collateral damage of energy-inefficient economic growth, but a primary responsibility to shape any ultimate global solutions to climate change. To date, cooperation has been elusive, owing as much to Washington's reluctance as to Beijing's intransigence. Painting China as the environmental bogeyman as an excuse for foot-dragging in policymaking is no longer an option; for its part, China, as the world's top polluter, must cease playing the developing-economy card. Yet energy security and climate change remain an area of genuine opportunity for joint achievement. Indeed, U.S.-China cooperation in this field is a sine qua non of any response to the energy and climate challenges. The sheer size of the Chinese economy means that collaboration with the United States could set the de facto global standards for etficiency and emissions in key economic sectors such as industry and transportation. Climate change also provides an area for cooperation in previously uncharted policy waters, as in emerging Arctic navigational and energy exploration opportunities. Washington and Beijing also share a deep and urgent interest in international peace and stability. The resumption of U.S.-China military contacts is a positive development. As two nuclear powers with worldwide economic and strategic interests, both countries want to minimize instability and enhance maritime security, as seen by parallel antipiracy missions in the waters otT Somalia. Joint efforts in support of United Nations peacekeeping, nonproliferation, and counterterrorism offer critical areas for bilateral and multilateral cooperation. Certainly, regional and global security institutions such as the Six-Party Talks concerning North Korea or the UN Security Council require the active engagement of both Washington and Beijing. Even more broadly, crisis management in geographic regions of mutual strategic interest like the Korean peninsula, Iran, or Burma require much more Sino-U.S. communication if the two countries are to avoid miscalculation and maximize opportunities to minimize human sutfering. Increasing the number of mid-level military-to-military exchanges would help in this regard. The United States and China could do more to cooperate on law enforcement to combat drug trafficking and organized crime in Western China. Afghanistan is competing with Burma as the main provider of narcotics to China; Washington could use its influence with the International Security Assistance Force in Kabul to develop a joint antinarcotics program. This could potentially build networks and joint capabilities that might be useful for U.S.-China cooperation on the issue of Pakistan. In addition, Washington should also encourage NATO-China cooperation along the Afghan border. Collaborating under the auspices of the Shanghai Cooperation Organization (SCO) might provide an additional framework for Beijing and Washington to address Central Asian security issues in a cooperative manner. 1he SCO, which includes Pakistan as an observer and will convene a multinational conference on Afghanistan in March 2009, has long made curbing narcoterrorism in Afghanistan a priority. In addition, the VS. Drug Enforcement Agency and the Chinese Anti-Narcotics Bureau should expand cooperation on interdiction and prosecution of heroin and meth traffickers. To be sure, there are a number of areas of serious divergence between Washington and Beijing. This should surprise no one. The United States has disagreements with even its allies. Two large powers with vastly dilferent histories, cultures, and political systems are bound to have challenges. History has shown, however, that the most effective way of addressing issues is for the U.S. and Chinese governments to engage in quiet diplomacy rather than public recrimination. In the U.S.-China context, there is often little to be gained—and much to be lost in terms of trust and respect—by a polarizing debate. Any differences, moreover, must not necessarily impede Sino-U.S. cooperation when both sides share strong mutual interests. I;. Scott Fitzgerald wrote that "the test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function."3 Effective policy toward China by the United States, and vice versa, will require this kind of dual-minded intelligence. Moreover, working together on areas of mutual and global interest will help promote strategic trust between China and the United States, facilitating possible cooperation in other areas. Even limited cooperation on specific areas will help construct additional mechanisms for bilateral communication on issues of irreconcilable disagreement. In fact, many of the toughest challenges in U.S.-China relations in recent years have been the result of unforeseen events, such as the accidental bombing of the Chinese embassy in Belgrade in May 1999 and the EP-3 reconnaissance plane collision in April 2001. Building trust and finding workable solutions to tough problems is the premise behind the Obama administrations foreign policy of smart power, as articulated by Secretary of State Clinton. Smart power is based on, as Secretary Clinton outlined in her confirmation hearing, the fundamental belief that 'We must use... the full range of tools at our disposal—diplomatic, economic, military, political and cultural—picking the right tool, or combination of tools, for each situation."' As the CS1S Commission on Smart Power noted in November 2007, "Smart Power is neither hard nor soft—it is the skillful combination of bothIt is an approach that underscores the necessity of a strong military, but also invests heavily in alliances, partnerships and institutions at all levels... .°5 As such, smart power necessarily mandates a major investment in a U.S.-China partnership on key issues. 'The concept enjoys broad support among the Chinese and American people and, by promoting the global good, it reaps concrete results around the world. There should be no expectation that Washington and Beijing will or should agree on all, or even most, questions. But the American and Chinese people should expect their leaders to come together on those vital issues that require their cooperation. U.S.-China partnership, though not inevitable, is indispensable.

## Econ

Trade deficit needs to be reduced – will end in economic collapse

Shostak 6(Frank Shostek, adjunct professor at the Ludwig von Mises Institue, President for the Applied Austrian School of Economics.“Does the widening US trade deficit pose a threat to the economy?” Ludwig von Mises Institute <http://mises.org/daily/2029>) AK

Most economists are extremely alarmed about the effect of the expanding deficit on the current account. In 2004 the deficit stood at $668 billion, or 5.7% of the gross domestic product (GDP). For 2005 we have estimated that the deficit was around $788 billion, or 6.3% of GDP. As a result of the ballooning deficit, the value of US net external liabilities, expressed at historical cost, jumped to $5.1 trillion in 2005 from $4.3 trillion in 2004. As a percentage of GDP, net external liabilities climbed to 41% in 2005 from 37% in the previous year and 4.9% in 1980. It is held that this increase in foreign debt cannot go on forever. If the Americans do not begin reducing their trade deficit, there will come a time when foreigners will become less willing to hold dollar denominated assets. This in turn will weaken the US dollar. Consequently, once this happens the United States will be forced to increase interest rates (maybe sharply) to continue to attract foreign investments. Higher interest rates in turn will plunge the economy into recession. In short, given the size of the current account deficit it is held that the US dollar has to plunge in a big way against most currencies, and it is not possible to avoid a painful adjustment as a result of this. It would appear that the trade deficit is a major economic problem that must be urgently addressed in order to avoid serious economic disaster.

### Trade deficit bigger internal link to the economy than debt ceiling

Rusnak 7/2(Karl Rusnak, July 2nd, 2011. Economy in Crisis: non-profit corporation dedicated to educating legislators and the American public on the destruction of our country's industrial base, the impact this has on national and economic security, and how it effects our standard of living. “Trade Deficit Needs Real Attention” <http://economyincrisis.org/content/trade-deficit-needs-real-attention>) AK

With the deadline to raise the debt limit looming, Democrats and Republicans are working tirelessly on budget deficit negotiations, yet they seem **oblivious to the problems posed by the trade deficit**. Budget deficits have always been a complex subject to sell to the American people. This is because the size, scope and timing of a budget deficit and its relation to overall debt can complicate how beneficial or damaging they are to the American economy. There are certain times when running a budget deficit may help jumpstart the economy and put the country on a path to economic prosperity that may continue for years. Trade deficits are not so complex, yet our elected officials have been steering us toward them for years when they should have been steering us away. The trade deficit is a much simpler concept: it is beneficial to export more than you import. So why then have our politicians enacted policies that have allowed our trade deficit to continue to grow over the years? It seems to be one of the few issues Republicans and Democrats are united on. Every president in recent decades has been a free trader in some form. It all seems to stem from the misguided belief that opening up new markets will fix the problem. The United States has been attempting this strategy for years. After opening its markets to imports, the U.S. trade surplus of $5 billion in 1960 flipped to a deficit of $6.4 billion in 1972. This prompted the Trade Act of 1974, which was intended to help bring down barriers for U.S. goods in foreign markets. The legislation did not have the intended effect, however, and the deficit ballooned to $34 billion in 1978. The U.S. continued to pass similar types of legislation over the years that were similarly ineffective in remedying the problem, including NAFTA. NAFTA has been one of the most damaging agreements for the U.S. economy, swapping the previous trade surplus with Mexico for a massive trade deficit. This deficit has cost the United States 682,900 U.S. jobs as of 2010, according to the Economic Policy Institute. All of these agreements have been passed under the guise of increasing exports, but all of them have failed to reduce the trade deficit. If they are not reducing the trade deficit, they are not helping the country as they were intended to. The trade deficit should be a kind of deficit reduction that Democrats and Republicans can agree on.

**Trade deficit outweighs budget deficit – will decimate our economy**

Barlett and Steele 6/18(Donald Barlett and James Steele, contributing editors at Vanity Fair. They have worked together for four decades, first at The Inquirer (1971-1997), where they won two Pulitzer Prizes and scores of other national journalism awards, then at Time magazine (1997-2006), where they earned two National Magazine Awards, and since 2006 at Vanity Fair. They have also written seven books, including the New York Times No. 1 best-seller America: What Went Wrong? “Lost Jobs: Why fixing the trade deficit matters most” June 18, 2011. <http://americawhatwentwrong.org/story/lost-jobs-why-fixing-trade-deficit-matters/>) AK

Washington is obsessed with the budget deficit. It's all that lawmakers can talk about. The hysteria is such that they can't even agree on raising the ceiling on the national debt. As for how much to cut out of the budget, some would settle on reduced spending in the billions. Others want much more. As one recent headline summed it up: "(House Speaker John) Boehner demands 'trillions' in spending cuts in exchange for lifting debt ceiling." There's only one problem: Congress is wrought up over the wrong deficit. The real deficit issue that has been out of control for 35 years is the trade deficit. That's the one that has decimated the American workforce, blocked the creation of millions of jobs, created millions more jobs for people in other countries, triggered pay cuts for millions of workers who still have jobs in the United States, and generally lowered the standard of living for many at the bottom and in the middle of the economic pile. Those at the top have flourished quite nicely under this policy. To be sure, the trade deficit in goods is inflated in part because the United States refuses to wean itself off imported oil. But the deficit goes well beyond oil. America's largest goods deficit is with China, a country that sells no oil. Apologists have argued that the policy enables consumers to buy goods at a much lower price than if they had been manufactured in America. But what they neglect to say, as we observed two decades ago when we first wrote *America: What Went Wrong,* our newspaper series and later a book, was that a country built on the principle that all that matters is the lowest possible price will look very different from a country that ensures all workers receive a living wage. To achieve the lowest prices, Democrats and Republicans threw open the doors to manufactured goods from countries whose governments protected their workforces, subsidized their industries, and blocked or restricted imports from the United States. As a result, the playing field was never level. It became so distorted that American taxpayers actually subsidized the creation of jobs in other countries. This mistake will be terminal for working Americans who have been deceived by lawmakers — Republicans and Democrats — for decades with false promises to correct a trade imbalance that has been catastrophic to their economic well-being. To appreciate the depth and extent of that deceit, let's go back to the early 1970s. Up to then, the United States ran trade surpluses. A nation's trade balance is a fundamental indicator to gauge the economic well-being of its workforce. When it's in balance — meaning imports and exports are roughly the same — it means people are employed at good-paying jobs. But when imports swamp exports — as is true in the United States — it means basic industries that long underpinned middle-class Americans are undercut, and good jobs vanish. Washington justified opening America's doors after World War II to manufactured products from other nations on the basis that foreign imports would not harm our own workers. How could a few trinkets and cheap transistor radios from Japan possibly hurt the great American economy? Plus, it was sold as good for the country: The more other countries prospered by selling to us, the more they could buy from us, which, in turn, would create more jobs at home. Reciprocity with our trading partners, we were told, would make it all work. The United States continued to post trade surpluses all through the 1960s, but as the decade wore on, and as imports continued to swell, the surpluses dwindled — from $5 billion in 1960 to just $607 million in 1969. By 1972 a miniscule surplus had turned into a whopping $6.4 billion deficit. Reciprocity obviously was not working. The U.S. market was open, but foreign markets for U.S. goods were not, and surging imports into the United States began to erode employment in longtime industries like apparel, shoes and textiles. The United States posted an anemic surplus in 1973 of $911 million, but that was the last trade surplus the country would ever see. With our trade ledger suddenly in the red, Congress held hearings and debated the issue for months, culminating in passage of the Trade Act of 1974. It was the first of what would become a steady stream of trade bills over the coming decades that both parties, in a rare display of bipartisanship, claimed would safeguard domestic industries and force our trading partners to open their markets to American goods. In urging adoption of the 1974 trade act, Democratic Sen. Russell Long of Louisiana said that "... the United States can no longer stand by and expose its markets, while other nations shelter their economies — often in violation of international agreements ... (with) practices which effectively discriminate against U.S. trade and production." Republican Sen. William Roth of Delaware asserted, "This bill strengthens basic legislation and statutes designed to protect our industries from unfair or disruptive import competition." Of course, it did nothing of the sort. Conditions worsened with the new legislation. The deficit soared from $6 billion in 1974 to $34 billion in 1978, an increase of 467 percent. Even more industries were under intense import pressure, threatening yet more jobs. Which meant it was time for Congress to pass another trade bill.

**Trade deficits destroys economy in short- and long-term**

Ahearn 10(Raymond Ahearn, Head of the International Trade and Finance Section at the Congressional Research Service (CRS), Professor at the Maxwell School @ Syracuse University. 8 December 2010. “Is the Trade Deficit a Problem for the U.S. Economy?” <http://freegovreports.com/index.php/finance/462-is-the-trade-deficit-a-problem-for-the-us-economy>) AK

The U.S. trade deficit is a dual problem for the economy. In the long term, it generates debt that must be repaid by future generations. Meanwhile, the current generation must pay interest on that debt. Whether the current borrowing to finance imports is worthwhile for Americans depends on whether those funds are used for investment that raises future standards of living or whether they are used for current consumption. If American consumers, business, and government are borrowing to finance new technology, equipment, or other productivity enhancing products, the deficit can pay off in the long term. If the borrowing is to finance consumer purchases of clothes, household electronics, or luxury items, it pushes the repayment of funds for current consumption on to future generations without investments to raise their ability to finance those repayments. In the short term, the trade deficit could lead to a large and sudden fall in the value of the dollar and financial turmoil both in the United States and abroad. Before the 2008-2009 global financial crisis, the U.S. current account deficit exceeded 6% of GDP and was placing downward pressure on the dollar. In 2008, the U.S. current account has been declining somewhat, and foreign investors looked to the United States as a safe haven for their money. As a result, the U.S. Treasury has had no problem selling securities to fund the U.S. budget deficit. Eventually, however, if foreign investors stop offsetting the trade deficit by buying dollar-denominated assets, U.S. interest rates would have to rise to attract more foreign funds into U.S. investments. Rising interest rates could cause havoc in financial markets and also may raise inflationary pressures. Global financial markets are now so closely intertwined that turmoil in one market can quickly spread to other markets in the world.

**Trade deficit is the best internal link into the recession – we risk double-dipping if we don’t fix it**

**Morici 9** (Peter Morici, economist and Professor of Economics at the University of Maryland, writing for Online Journal Feb 12, 2009 “US trade deficit is a significant cause of recession”. <http://infowars.net/articles/february2009/120209trade.htm>) AK

Yesterday, the Commerce Department reported the 2008 deficit on international trade in goods and services was $677.1 billion. This is down from $700.3 billion in 2007 but still 4.7 percent of GDP. The trade deficit was smaller in 2008, because economic growth and consumer spending began to decline during the second half 2008. Trade deficits and shoddy banking practices pushed the economy into recession, and until both trade and the banks are fixed, sustained economic growth cannot be accomplished. The trade deficit will rise again as the effects of the stimulus package are felt, but if its underlying causes are not addressed, the trade deficit will drag the economy back down into a **double dip recession**. Pushed up by the surge in oil prices and the ballooning trade gap with China, the trade deficit is reducing U.S. GDP by $400 billion, annually, and significantly adding to the pain imposed by the unfolding recession. The negative effects of the trade deficit on GDP and employment overwhelm the potential positive effects of President Obama’s proposed stimulus spending. To finance the deficit of recent years, Americans have borrowed more than $6.5 trillion from foreign sources, including foreign governments, and the debt service comes to more than $1,500 for each working American. In addition, foreign investors have invested at least $3.6 billion acquiring equities in U.S. businesses. The flood of dollars into foreign government hands has bloated sovereign wealth funds that are now buying significant shares of U.S. businesses and other property, and threaten to compromise the loyalties of U.S. businesses. The Chinese government alone holds about $2 trillion in U.S. and other securities, and these could be used to purchase about 20 percent of the value of publicly traded U.S. companies. Add to that the holding of Middle East sovereigns and royal families, the potential purchases of U.S. businesses by foreign governments with interests unfriendly to the United States is alarming. This should give Americans real pause for concern about Chinese and other foreign government intentions to diversify their foreign exchange holdings into U.S. stocks and other real assets. Anatomy of the hemorrhaging current account In 2008, the United States had a $144.1 billion surplus on trade in services. This was hardly enough to offset the massive $821.2 billion deficit on trade in goods. The deficit on petroleum products was $386.3 billion, up from $293.2 billion in 2007. The average price for imported crude oil rose to $95.23 from $64.28 percent from 2007, while the volume of petroleum imports fell 4.0 percent. Also, the American appetite for inexpensive imported consumer goods and cars is a huge factor driving up the trade deficit. The trade deficit with China was $266.3 billion, a new record and up from $256.2 billion in 2007. The deficit on motor vehicle products was $107.1 billion. Ford and GM continue to push their procurement offshore and cede market share to Japanese and Korean companies. However, the automotive trade deficit was down from $120.9, as Asian automakers continued to expand production in North America and demand for autos fell with the recession. The trade deficit should ease in 2009 with lower oil prices and as the recession bears down on consumer spending. However, China is not permitting its currency to rise in value, despite its trade surplus and has beefed up subsidies on its exports in an effort to export its unemployment to the United States and other industrialized countries. China’s beggar-thy-neighbor protectionism threatens to ignite a global trade war of devastating proportions. In 2010, as stimulus spending in the United States and elsewhere lifts economic activity, the trade deficit will increase again, oil prices will surge and China’s exports will rise above 2008 levels, thanks to an undervalued currency and larger export subsidies. The U.S. trade deficit will rise beyond its peak of 5.1 percent of GDP, and this may well pull the U.S. economy back into recession. Dollars spent on imported oil and cars and consumer goods from China cannot be spent on U.S. goods and services, and every dollar that U.S. imports exceed exports negates at least one dollar of federal stimulus spending. Overall, the trade deficit overwhelms the positive effects of the Obama stimulus package on demand for U.S. goods and services, GDP and employment. Along with the banking crisis, the trade deficit is a primary cause of the U.S. recession. The dollar remains at least 40 to 50 percent overvalued against the Chinese yuan and other Asian currencies. Although China adjusted the yuan from 8.28 per dollar to 8.11 in July 2005 and permitted it to rise gradually to 6.84 by July 2008, the value of the yuan has not changed since. To sustain an undervalued currency in 2008, China purchased approximately $600 billion in U.S. and other foreign securities, creating a 40 percent subsidy on its exports of goods and services. Other Asian governments align their currency policies with China to avoid losing competitiveness to Chinese products in lucrative U.S. and EU markets. Consequences for economic growth High and rising trade deficits tax economic growth. Specifically, each dollar spent on imports that is not matched by a dollar of exports reduces domestic demand and employment, and shifts workers into activities where productivity is lower. Productivity is at least 50 percent higher in industries that export and compete with imports, and reducing the trade deficit and moving workers into trade-competing industries would increase GDP. Were the trade deficit cut in half, GDP would increase by at least $400 billion, or about $2,750 for every working American. Workers’ wages would not be lagging inflation, and ordinary working Americans would more easily find jobs paying higher wages and offering decent benefits. Manufacturers are particularly hard hit by this subsidized competition. Through the recent economic expansion and recession, the manufacturing sector has lost 4.6 million jobs since 2000. Following the patterns of past economic expansions, the manufacturing sector should have kept at least 2 million of those jobs, especially given the very strong productivity growth accomplished in durable goods and throughout manufacturing. Longer-term, persistent U.S. trade deficits are a substantial drag on growth. U.S. import-competing and export industries spend three-times the national average on industrial R&D, and encourage more investments in skills and education than other sectors of the economy. By shifting employment away from trade-competing industries, the trade deficit reduces U.S. investments in new methods and products, and skilled labor. Cutting the trade deficit in half would boost U.S. GDP growth by one percentage point a year, and the trade deficits of the last two decades have reduced U.S. growth by one percentage point a year. Lost growth is cumulative. Thanks to the record trade deficits accumulated over the last 20 years, the U.S. economy is about $3 trillion smaller. This comes to about $20,000 per worker. Had the administration and the Congress acted responsibly to reduce the deficit, American workers would be much better off, tax revenues would be much larger, and the federal deficit would be much smaller. The recession would be much less severe. If the Obama administration relies on stimulus and bank reform alone, the economy will fall back into recession once the spending has run its course. A pattern of false recoveries, much as occurred during the Great Depression, will likely emerge. Conditions will not be as bad, unemployment will stay at unacceptable levels.

### Reducing the trade deficit is key to economic recovery

Williford 10(Sam Williford, graduated from the College of Charleston worked for Senator Robert Ford for Congressman John Spratt. May 21, 2011.

“Different Deficit Cause of Jobless Recovery” http://www.economyincrisis.org/content/different-deficit-cause-jobless-recovery) AK

While many politicians are now blaming a lack of jobs on the federal budget deficit, it is actually **America's trade deficit** that is the cause of our problems. The U.S. is still nearly 19 million jobs behind where it was when the Great Recession started, and now has less people employed than in 2001. The economy has been unable to create jobs due to America's massive trade deficit(when a nation imports more than it exports) caused by failed economic policy. Since 1975, the U.S. has imported more goods than it has exported. Last year alone, the U.S. had a deficit of $478 billion in global trade. A large portion of this is oil imports, but consumer goods are another area where the U.S. imports virtually everything. Trade policy that encourages businesses to relocate production of goods to other nations without penalizing them for selling those goods back to this nation has resulted in millions of jobs lost. White House estimates show that for every $1 billion in goods exported, the economy creates 5,000 jobs. Unfortunately, that street goes two ways, with data from the Economic Policy Institute showing that for every $1 billion in goods imported, the economy loses 9,000 jobs. While President Obama's plan to double exports in the next few years is a good idea, even more critical is reducing foreign imports. Making it possible for American businesses to sell products to the American people would open up a market long denied to them. This would help create American jobs and help protect our national security (the decline of American manufacturing has forced the military to increasingly rely on foreign suppliers). “Free” trade has not been “free” at all, but has cost America millions of jobs. More than three decades of its implementation and colossal failures such as NAFTA have proven that in practice it does not work. America must work to implement revised trade policy that will reduce our trade deficits and create jobs.

## Impact – Limitless Resources Key

### Economic growth is vital to human civilization – this requires access to limitless resources

Collins and Autino, 10 - \* Life & Environmental Science, Azabu University AND \*\* Andromeda Inc., Italy

Patrick and Adriano, “What the growth of a space tourism industry could contribute to employment, economic growth, environmental protection, education, culture and world peace,” Acta Astronautica 66 (2010) 1553–1562, science direct

The continuation of human civilisation requires a growing world economy, with access to increasing resources. This is because competing groups in society can all improve their situation and reasonable fairness can be achieved, enabling social ethics to survive, only if the overall ‘‘economic pie’’ is growing. Unfortunately, societies are much less robust if the ‘‘pie’’ is shrinking, when ethical growth becomes nearly impossible, as competing groups try to improve their own situation at the expense of other groups. Continued growth of civilisation requires continual ethical evolution, but this will probably be possible only if resources are sufﬁcient to assure **health, comfort, education and fair employment** for all members of society. The world economy is under great stress recently for a number of reasons, a fundamental one being the lack of opportunities for proﬁtable investment—as exempliﬁed by Japan’s unprecedented decade of zero interest-rates. This lack of productive investment opportunities has led a large amount of funds in the rich countries to ‘‘churn’’ around in the world economy in such forms as risky ‘‘hedge funds’’, causing ever greater ﬁnancial instability, thereby further weakening economic growth, and widening the gap between rich and poor. Increasing the opportunities for proﬁtable, stable investment requires continual creation of new industries [16]. Governments today typically express expectations for employment growth in such ﬁelds as information technology, energy, robotics, medical services, tourism and leisure. However, there are also sceptical voices pointing out that many of these activities too are already being outsourced to low-cost countries which are catching up technologically in many ﬁelds [20]. Most of the new jobs created in the USA during the 21st century so far have been low-paid service work, while the number of US manufacturing jobs has shrunk rapidly [21]. It is thus highly relevant that aerospace engineering is a ﬁeld in which the most technically advanced countries still have a substantial competitive advantage over later developing countries. Hence, if a commercial space travel industry had already been booming in the 1980s, the shrinkage in aerospace employment after the end of the ‘‘cold war’’ would have been far less. Consequently it seems fair to conclude that the decades-long delay in developing space travel has contributed to the lack of new industries in the richer countries, which is constraining economic growth and causing the highest levels of unemployment for decades. The rapid economic development of China and India offers great promise but creates a serious challenge for the already rich countries, which need to accelerate the growth of new industries if they are to beneﬁt from these countries’ lower costs without creating an impoverished under-class in their own societies. The long-term cost of such a socially divisive policy would greatly outweigh the short-term beneﬁts of low-cost imports. The development of India and China also creates dangers because the demands of 6 billion people are now approaching the limits of the resources of planet Earth. As these limits are approached, governments become **increasingly repressive**, thereby adding **major social costs to** the direct costs of environmental damage [22]. Consequently, as discussed further below, it seems that the decades-long delay in starting to use the **resources of the solar system** has already caused heavy, selfinﬂicted damage to humans’ economic development, and must be **urgently overcome**, for which a range of policies have been proposed in [23,24].

## Impact – Energy Shortage 🡺 Imperial Wars

### Leads to neo-imperial resource conflicts

Hatch 10 – JD Candidate @ Emory

Benjamin Hatch, JD Candidate @ Emory, “Dividing the Pie in the Sky: The Need for a New Lunar Resources Regime,” Emory Int’l Law Review, Hein Online

The **dominant political conflict** of the twenty-first century will likely be over control of non-renewable resources. Recently, a wealth of literature has appeared alleging that the world's resource-rich slates have been overstating their oil and non-energy mineral reserves. Those reserves that have been properly catalogued arc also being rapidly depleted. This depletion will not only have catastrophic effects on local economies, but it will also lead to an **increase in global violence** and **neo-imperialism** in lesser developed but resource-rich states. In preparation for the inevitable worsening scarcity of available energy resources, states and non-governmental organizations are researching and investing in alternative fuel sources." While experts debate the merits of "green' energies that seek to harness natural forces (like wind, gcothcrmal, hydroelectric, and solar power), many developed states are beginning lo look toward another part of nature as a potential solution to the impending energy crisis—the Moon.

## Impact – Resource Wars Go Nuclear

### SPS solves energy wars – go nuclear

-solves proliferation

Richardson 93 – Brigadier General, USAF

Robert Richardson, “Solar Power: The Next ‘Great Leap Forward’”, 1993, The Journal of Social, Political and Economic Studies, Fall, p. 259-264

The U.S. now faces great problems. Among these are security versus proliferation of nuclear and other advanced weapons technology; maintaining technological ledership and space control in the post-cold war era; controlling immigration and population shifts; meeting a deficit by reducing government spending; sustaining employment and industrial growth; and keeping the peace elsewhere. While these appear unrelated, they actually have a potential solution in common – energy. The world is slowly running out of energy. Or, at least out of affordable, non-polluting, sources of energy in the quantities that will be needed to maintain, let alone increase, the standards of living for a growing world population and thereby directly or indirectly solve most of these problems – at least temporarily. Until now, nations sought to meet their energy and security requirements on their own in collaboration with a few selected allies. As a result, standards of living now vary widely between industrialized and non-industrialized countries. This gap, exacerbated by a greater growth rate in the population of the poorer countries, is causing ever-increasing social and political problems. It is also largely responsible for increasing emigration by people in these countries to nations and areas where higher standards of living offer them greater opportunities and better living conditions. One effect of the emigration trend, from the "have not" to the "have" countries, has been the institution of measures by the governments involved to control or counter it. Immigration at levels and rates that cannot be absorbed by host countries leads to ethnic and racial mixes that invariably bring about social tensions and conflicts. This is especially true in countries that had previously enjoyed a relatively homogeneous citizenry. The proper way for nations with high standards of living to go about helping disadvantaged areas, peoples, and economies is not to share their wealth and environment by opening up their borders to the "poor and less fortunate masses of the world." It is, rather, by exploiting the technological and educational advantages of advanced economies to provide the less developed nations with the means and know-how to industrialize their societies and thereby raise the standards of living within their own countries while retaining their historic racial, ethnic, and national identities. The net effect of unbridled immigration on a massive scale must necessarily be the lowering of the standards of living in the host countries to the lowest common denominator of all involved, and this is obviously at the expense of the people of those counlries that now enjoy high standards. In other words, wise governments should not open their doors, or provide money in the form of foreign aid to help others, except in extreme situations where temporary relief can only be had by outright charity. What they should do is to apply their technological and managerial talents towards developing new global resources and creating capabilities that will provide the poor areas and nations with the means to industrialize and thereby improve permanently their economies. Industrialization is the logical solution to raising standards of living in over-populated areas. Worldwide population has passed the point where worthwhile additional land can be readily obtained through migration. On the other hand, population growth, occurring within fixed borders and where there are no means of accommodating it, creates social and political pressures that threaten peace and prevent the international cooperation sought by most responsible governments. Eventually, emigration of surplus populations to other planets may be possible, but for the immediate future industrialization is the logical, if not only, escape valve for overcrowded nations. While industrialization requires education, raw materials, and some technological sophistication, it depends mainly on reasonably affordable access to energy. Even when a country has the basic raw materials it needs to industrialize, it cannot hope to extract and process these without reliable and affordable energy. So availability of plentiful power is key to improving the standards of living in the "have not" parts of the world. Those countries that enjoy access to energy, and have a strong technological and industrial base as a result, are able to achieve and maintain high standards of living for their people. Conversely, those without energy have been steadily losing what little standards they were able to maintain in the past. The result of this has been to create tensions and discontent on both sides. In simple terms the problem that those who want peace and prosperity on earth now face is how to close the energy gap. Solving this problem would obviously do more towards achieving most national goals, including those of the U.S., than all the economic and social theories, and political proposals, advocated by politicians and academics. Common sense suggests that worldwide peace and prosperity will not be achievable until there is a rough leveling of standards of living among nations. Achieving this through open border policies leading to major geographical shifts in populations should be unacceptable to those better-off societies whose current standards would obviously be reduced as a result. Recent attitudes in California on Mexican immigration attest to this. A better solution is to help the poorer countries and economies industrialize. This would provide on-site employment for people who would otherwise emigrate. It would also enhance the world trade prospects of the poor nations. The "**keystone**" of industrialization is energy. While obviously other ingredients will also be necessary, such as raw materials and know-how, providing affordable power in sufficient quantities is clearly the first step. In the case of the U.S., this means diverting at least a part of the billions in fiscal or end-product aid that now goes to third world areas and applying this money to developing new, global, energy sources which would eventually allow these to industrialize and thus become somewhat self-sufficient. Some will no doubt argue that this would be shifting foreign aid into U.S. high technology and energy research, and is hence self-serving. One answer to that is that giving financial aid in order to make it possible for the recipient to buy U.S. wheat or other products is even more self-serving. This traditional self-serving approach is nothing but an agricultural subsidy that launders the money enroute without solving the initial recipient's basic problem. What all this suggests is that the more advanced and better off countries should initially concentrate more of their foreign aid on the development and provision of energy. Providing Energy on a Global Scale Technological progress in the collection and transmission of solar energy, and in associated space systems, has reached the stage where a bold, U.S.-led, program could provide not only America but the entire world a new, safe, plentiful, and relative inexpensive source of power. The costs of doing this need not be excessive and the benefits of doing it are obvious. Access to energy should not only relieve the growing pressures for aid and immigration in Third World nations, but the development of energy is the logical way to shift the high technology, defense-based, aerospace industries of America into a nondefense field of activity compatible with their expertise and capabilities. There are now good reasons for doing this. From a selfish U.S. point of view, the fringe benefits of accomplishing this would include: (1) affordable U.S. security for the foreseeable future, (2) a major alternative to cold war defense employment and production, (3) additional U.S. jobs and overseas markets, and (4) assured U.S. **worldwide leadership in technology**. These, alone, are worth the investment even if it did not also further peace and stability by making it possible for the "have not" countries to raise their standards of living through industrialization. This is an all-win, no-lose way to go. All it now takes is a little understanding, imagination, risk-taking and leadership – qualities that are admittedly in short supply in government today. The world energy problem needs no explanation. Most nations are now dependent on fossil fuels, coal and oil, for heat and electricity. Worldwide supplies of fossil fuels have been declining as known deposits are extracted and exploited. Access to these, even where available, has become both costly and politically unreliable. All Americans remember the "oil shock" of October 1973 and subsequent 1990/91 events in the Middle East in which access to oil played a role. No one really believes that had not the Middle East been the repository of much of the oil the industnal wor.ld depended on, America would have led the effort It did to keep Its control out of the hands of Saddam Hussein - using "save dear little Kuwait" as the excuse. A logical conclusion from these events is that if the major powers will go to war to protect their access to energy, other nations lacking it will do the same if and when they acquire weapons that might make this profitable. This last thought suggests that we can add the **prevention of proliferation of missiles and atomic weapons** to our list of fringe benefits from the **development of new sources of energy**.

## Impact – Resource Wars Go Global

### Energy wars go global

Schubert 10 – PhD in electrical engineering

Peter J. Schubert, PhD in electrical and computer engineering from Purdue University, holds 30 US patents, 8 foreign patents, and has published over 60 technical papers and book chapters, 12-2010, “Costs, Organization, and Roadmap for SSP,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/schubert.html

For a miracle to occur the US must perceive a real and on-going threat. Considering the most problematic areas listed above gives guidance on what sort of threats may arise. Environmental events may be roughly divided into regional disasters lasting days, weeks, or years (tsunamis, hurricanes, droughts); or decimating global weather shifts lasting generations (megavolcanic eruptions, ice age, runaway thermal superstorms). Either type threatens SSP. Regional disasters draw down funding coffers to provide immediate relief and possibly rebuilding; while decimations reduce commerce such that long-term, high-cost projects are no longer affordable. The same logic holds true for nuclear events, whether localized (Hiroshima, Nagasaki, Chernobyl), or widespread and generational (global thermonuclear war). Energy shortages will drive prices until economic necessity overcomes free market forces, and **wars erupt**. These may be regional, lasting years; or they may escalate **into a third Great War** over scarce energy sources. None of these options favor SSP.

## Impact – Comparatively Largest Impact

### Comparatively the largest impact

Hsu 10 – PhD in Engineering

Feng, PhD in Engineering, Former head of the NASA GSFC risk management function, and was the GSFC lead on the NASA-MIT joint project for risk-informed decision-making support on key NASA programs, has over 90 publications and is coauthor of two books and co-chair of several technical committees, 12-2010, “Harnessing the Sun: Embarking on Humanity's Next Giant Leap,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/hsu.html

It has become increasingly evident that facing and solving the multiple issues concerning energy is the **single most pressing problem** that we face as a species. In recent years, there has been extensive debate and media coverage about alternative energy, sustainable development and global climate change, but what has been missing (at least in the mainstream media) is the knowledge and point of view of scientists and engineers. From the scientists or engineers perspective, this paper discusses the prospects for mankind's technological capability and societal will in harnessing solar energy, and focuses on the issues of: 1) space based solar power (SBSP) development, and, 2) why it is imperative that we must harness the unparalleled power of the sun in a massive and unprecedented scale, which I believe will be humanity's next giant leap forward.

## Impact – ME Oil Dependence

### SSP drastically decreases oil dependence on Middle East

Foust 7 - editor and publisher of The Space Review

Jeff Foust, editor and publisher of The Space Review, 2007, “A renaissance for space solar power?,” The Space Review, http://www.thespacereview.com/article/931/1

For nearly four decades, one concept has tantalized space professionals and enthusiasts alike: space solar power. The ability to collect solar power in space, continuously and in effectively limitless quantities, and then transmit that energy back to Earth, could radically reshape not only the space industry but also society in general. That clean (or, in the current vernacular, carbon neutral) energy would, advocates claim, **help meet the growing energy needs** of an increasingly developed world without relying on sources that degrade the environment and/or come from politically unstable regions of the globe. That demand for energy, in turn, would create tremendous demand for launch and other space services, driving down costs that would, in turn, open other markets. Not everyone is sold, however, on the viability or cost-effectiveness of space solar power, leading to long-running debates on the topic. Those disputes have remained largely academic, though, since there has been little support for research in the field: after the original studies by NASA and the Department of Energy (DOE) ended in the late 1970s, the only concerted effort, other than some isolated studies in Europe and Japan, was NASA’s “Fresh Look” studies in the late 1990s in cooperation with the National Science Foundation (NSF). Space solar power has withered on the vine since then, but a confluence of events has provided proponents with a new opportunity to reinvigorate the subject. Progress, but no champion It’s easy to see why people are willing to give space solar power another look. High oil prices, worries about the political stability of places like the Middle East that are key sources of energy, and heightened concerns about climate change have created a **mad scramble** in the last several years for alternative energy, from wind and terrestrial solar to biofuels like E85 ethanol. John Mankins, who managed the last major NASA space solar power study, the “Fresh Look” study in the late 1990s, said during a Marshall Institute forum on space solar power in Washington last week that there was little interest at the time because oil was $15 a barrel; now it’s about five times as expensive.

## Impact – Imperial Wars

### Oil dependence leads to interventionist wars that perpetuate our imperialism

Collina 5

Tom Z. Collina, Executive Director of 20-20Vision; testimony in front of Committee on Foreign Relations Subcommittee on Near Eastern and South Asian Affairs United States Senate “Oil Dependence and U.S. Foreign Policy: Real Dangers, Realistic Solutions”. October 19, 2005 <http://www.globalsecurity.org/military/library/congress/2005_hr/051020-collina.pdf>

More conflicts in the Middle East America imports almost 60% of its oil today and, at this rate, we’ll import 70% by 2025. Where will that oil come from? Two-thirds of the world’s oil is in the Middle East, primarily in Saudi Arabia, Iran and Iraq. The United States has less than 3% of global oil. The Department of Energy predicts that North American oil imports from the Persian Gulf will double from 2001 to 2025.i Other oil suppliers, such as Venezuela, Russia, and West Africa, are also politically unstable and hold no significant long-term oil reserves compared to those in the Middle East. Bottom line: our economy and security are increasingly dependent on one of the most unstable regions on earth. Unless we change our ways, we will find ourselves even more at the mercy of Middle East oil and thus more **likely to get involved in future conflicts**. The greater our dependence on oil, the greater the **pressure to protect and control that oil**. The growing American dependence on imported oil is the primary driver of U.S. foreign and military policy today, particularly in the Middle East, and motivates an aggressive military policy now on display in Iraq. To help avoid similar wars in the future and to encourage a more cooperative, responsible, and multilateral foreign policy the United States must significantly reduce its oil use. Before the Iraq war started, Anthony H. Cordesman of the Center for Strategic and International Studies said: “Regardless of whether we say so publicly, we will go to war, because Saddam sits at the center of a region with more than 60 percent of all the world's oil reserves.” Unfortunately, he was right. In fact, the use of military power to protect the flow of oil has been a central tenet of U.S. foreign policy since 1945. That was the year that President Franklin D. Roosevelt promised King Abdul Aziz of Saudi Arabia that the United States would protect the kingdom in return for special access to Saudi oil—a promise that governs U.S. foreign policy today. This policy was formalized by President Jimmy Carter in 1980 when he announced that the secure flow of oil from the Persian Gulf was in “the vital interests of the United States of America” and that America would use “any means necessary, including military force” to protect those interests from outside forces. This doctrine was expanded by President Ronald Reagan in 1981 to cover internal threats, and was used by the first President Bush to justify the Gulf War of 1990-91, and provided a key, if unspoken rationale for the second President Bush’s invasion of Iraq in 2003.ii The Carter/Reagan Doctrine also led to the build up of U.S. forces in the Persian Gulf on a permanent basis and to the establishment of the Rapid Deployment Force and the U.S. Central Command (CENTCOM). The United States now spends over $50 Billion per year (in peacetime) to maintain our readiness to intervene in the Gulf.iii America has tried to address its oil vulnerability by using our military to protect supply routes and to prop up or install friendly regimes. But as Iraq shows the price is astronomical—$200 Billion and counting. Moreover, **it doesn’t work**—Iraq is now producing less oil than it did before the invasion. While the reasons behind the Bush administration’s decision to invade Iraq may be complex, can anyone doubt that we would not be there today if Iraq exported coffee instead of oil? It is time for a new approach. Americans are no longer willing to support U.S. misadventures in the Persian Gulf. Recent polls show that almost two-thirds of Americans think the Iraq war was not worth the price in terms of blood and treasure. Lt. Gen William Odom, director of the National Security Agency during President Reagan's second term, recently said: "The invasion of Iraq will turn out to be the greatest strategic disaster in U.S. history." The nation is understandably split about what to do now in Iraq, but there appears to be widespread agreement that America should not make the same mistake again—and we can take **a giant step toward** that goal by **reducing our dependence on oil**.

## Impact – Superpower War

### As long as we`re dependent on oil, superpower war with Russia and China is inevitable

Klare 4(Klare, Michael. Author of Blood and Oil: The Dangers and Consequences of America's Growing Dependency on Imported Petroleum, expert on oil dependency as professor of Peace and World Security Studies and director of the Five College Program in Peace and World Security Studies. Interview with the Carnegie Council on September 30, 2004. <http://www.carnegiecouncil.org/resources/transcripts/5017.html>) AK

This is troubling enough, but to conclude my panorama, the United States is not the only country that is militarizing its foreign oil policy. So are Russia and China. For Russia, it's not so much a need to acquire oil, because they have a lot of it, but because the Russians are attempting to reestablish their prominence as a major power. It's the explicit strategy of Vladimir Putin and his associates for Russia to be a dominant player in the oil flow from the Caspian Sea area to the West. They are expanding their Caspian Sea fleet. They are building new bases in the area. They maintain troops in Armenia, in Tajikistan, in Georgia, and also in Abkhazia. So in the Republic of Georgia you now have Russian troops and American troops within very close proximity. And the Russians are fighting a brutal war in Chechnya, which is ultimately driven on Russia's part by its absolute determination to control this critical strategic crossroads right in the heart of its oil pipeline empire in the Caspian Sea region. Grozny was the Houston of the former Soviet Union. It was the major concentration of refineries, and all of the pipelines from southern Russia met in Grozny. This was an absolutely pivotal center in their oil empire. They are absolutely determined to control this area, at least in part, because of this legacy and its strategic location. So Russia is a key player in this area. China is also becoming very interested in the Caspian Sea region and in the Persian Gulf as well. China's demand for oil is expected to quadruple during the first quarter of the 21st century. Their oil output, like that in the U.S. and in Europe, is in decline. They are becoming increasingly dependent on imported oil. Their leaders see Central Asia, the Caspian, and the Persian Gulf as the main source of China's future oil. China is copying the United States and Russia by militarizing its foreign oil policy, providing arms and military assistance, and even troops it's believed, to the government of Sudan in its war against the SPLA in the south. China is the leading investor in Sudan's major oil company in the southern part of the country. China provides arms and technology to Iran, one of its major suppliers. And through the Shanghai Cooperation Organization, China is developing close military ties with Kazakhstan, Uzbekistan, and Kyrgyzstan, holding joint military maneuvers, providing them with weapons. So now you have a three-power military competition underway in the Central Asia Caspian region, all involving not so much necessarily direct presence, but building up military alliances with local governments, and in some cases insurgent forces, ethnic separatist groups; like the Russian presence in Abkhazia. If you look back in history for a similar moment, where you have so many powers competing for geopolitical influence in a volatile area, the example that comes to mind is the struggle in the Balkans before World War I**,** when the Austrian Empire and the Russian Empire and the British and the French were all competing for influence, providing military assistance to the local powers, getting involved in internal disputes, and we know what happened in Sarajevo in 1914. I see no evidence that any of these countries is backing off from their determination to dominate militarily the area where all of this oil is being sought. Because of the geographic shifts in the production of oil to areas of instability, growing competition for access to that oil, and the militarization of foreign oil policy, we are risking a **very high level of violence emerging**. Whether the net supply of the world rises for a while or declines, oil will be increasingly in competition. In a situation where these supplies are all the subject of military rivalries and intervention, this will lead to an **ongoing series of oil wars for as long as we continue to depend on this substance**

## Impact – US-China War

### Dependency creates resource competition with China

Collina 5

Tom Z. Collina, Executive Director of 20-20Vision; testimony in front of Committee on Foreign Relations Subcommittee on Near Eastern and South Asian Affairs United States Senate “Oil Dependence and U.S. Foreign Policy: Real Dangers, Realistic Solutions”. October 19, 2005 <http://www.globalsecurity.org/military/library/congress/2005_hr/051020-collina.pdf>

With over one billion people, China is second only to the U.S. in oil consumption—and gaining fast. China has one of the fastest growing economies in the world and an energy demand that is projected to grow by 150% by 2020. China’s oil demand is increasing seven times faster than America’s.v China currently imports half of its oil, and like the United States, China will become increasingly dependent on oil from the Middle East. As a result, access to Middle East oil will over time become a key issue in relations between the two nations. The more U.S. actions in the Middle East are perceived as an effort to dominate oil resources there, the more China will consider the United States a threat to its interests, and visa-versa. In the current context of stagnating supply, this kind of demand competition is very destabilizing. Defusing a potential U.S.-Chinese rivalry over global oil supplies is a key driver for reducing U.S. oil dependency. While China’s oil demand is growing rapidly, U.S. demand in absolute terms is much larger, accounting for a quarter of the world’s oil consumption. To its credit, China is taking steps to protect itself from the increasingly tight, volatile global oil market by controlling its oil demand. Last year China set fuel economy standards that are higher than those here in the United States.vi

### Oil dependence leads to superpower conflict with China

Luft 4

Gal, writer LA Times, accessed Institute for the Analysis of Global Security. February 2, 2004. “U.S., China Are on Collision Course Over Oil” <http://www.iags.org/la020204.htm>

Sixty-seven years ago, oil-starved Japan embarked on an aggressive expansionary policy designed to secure its growing energy needs, which eventually led the nation into a world war. Today, another Asian power thirsts for oil: China. While the U.S. is absorbed in fighting the war on terror, the seeds of what could be the next world war are quietly germinating. With 1.3 billion people and an economy growing at a phenomenal 8% to 10% a year, China, already a net oil importer, is growing increasingly dependent on imported oil. Last year, its auto sales grew 70% and its oil imports were up 30% from the previous year, making it the world's No. 2 petroleum user after the U.S. By 2030, China is expected to have more cars than the U.S. and import as much oil as the U.S. does today. Dependence on oil means dependence on the Middle East, home to 70% of the world's proven reserves. With 60% of its oil imports coming from the Middle East, China can no longer afford to sit on the sidelines of the tumultuous region. Its way of forming a footprint in the Middle East has been through providing technology and components for weapons of mass destruction and their delivery systems to unsavory regimes in places such as Iran, Iraq and Syria. A report by the [U.S.-China Economic and Security Review Commission](http://www.uscc.gov" \t "_blank), a group created by Congress to monitor U.S.-China relations, warned in 2002 that "this arms trafficking to these regimes presents an increasing threat to U.S. security interests in the Middle East." The report concludes: "A key driver in China's relations with terrorist-sponsoring governments is its dependence on foreign oil to fuel its economic development. This dependency is expected to increase over the coming decade." Optimists claim that the world oil market will be able to accommodate China and that, instead of conflict, China's thirst could create mutual desire for stability in the Middle East and thus actually bring Beijing closer to the U.S. History shows the opposite: **Superpowers find it difficult to coexist while competing over scarce resources**. The main bone of contention probably will revolve around China's relations with Saudi Arabia, home to a quarter of the world's oil. The Chinese have already supplied the Saudis with intermediate-range ballistic missiles, and they played a major role 20 years ago in a Saudi-financed Pakistani nuclear effort that may one day leave a nuclear weapon in the hands of a Taliban-type regime in Riyadh or Islamabad. Since 9/11, a deep tension in U.S.-Saudi relations has provided the Chinese with an opportunity to win the heart of the House of Saud. The Saudis hear the voices in the U.S. denouncing Saudi Arabia as a "kernel of evil" and proposing that the U.S. seize and occupy the kingdom's oil fields. The Saudis especially fear that if their citizens again perpetrate a terror attack in the U.S., there would be no alternative for the U.S. but to terminate its long-standing commitment to the monarchy — and perhaps even use military force against it. The Saudis realize that to forestall such a scenario they can no longer rely solely on the U.S. to defend the regime and must diversify their security portfolio. In their search for a new patron, they might find China the most fitting and willing candidate. The risk of Beijing's emerging as a competitor for influence in the Middle East and a Saudi shift of allegiance are things Washington should consider as it defines its objectives and priorities in the 21st century. Without a comprehensive strategy designed to prevent China from becoming an oil consumer on a par with the U.S., **a superpower collision is in the cards**. The good news is that we are still in a position to halt China's slide into total dependency.

## Impact – Hegemony

### Oil gives small countries complete power over our hegemony – worse impact than WMD attack

Czamik 7 (Lieutenant Colonel Joseph E. Czarnik USAWC STRATEGY RESEARCH PROJECT – “US OIL DEPENDENCY--THE NEW WEAPON OF MASS DISRUPTION” United States Army Reserve 30 MAR 2007 DTIC) AK

One could easily argue that the United States’ current addiction to imported fossil fuel has become its greatest economic and political challenge. Others go even further and contend that in addition to United States domestic policy, U.S. foreign policy is negatively affected by rising oil prices in that the extra proceeds from oil can cause nations to move away from democracy. Oil supply can be used against the United States as a **strategic weapon**. The US Government defines Weapons of Mass Destruction (WMD) as Chemical, Biological, Radiological, Nuclear, and High-Yield Explosives (CBRNE).7 However, oil flow disruption could have greater economic consequences to the United States than most CBRNE events. Oil-rich nations have long had the ability to disrupt the free flow of oil and they have not been afraid to use disruption as a weapon against the United States.8 The United States should prepare for attacks that come in the form of weapons of mass disruption with oil being a **most likely candidate.** America’s military is arguably the strongest in the world, yet an adversary could deliver this great power a **devastating blow without ever engaging the military.**

### Oil dependence destroys our readiness for disasters and gives hostile rivals a stranglehold on our leadership

Czamik 7 (Lieutenant Colonel Joseph E. Czarnik USAWC STRATEGY RESEARCH PROJECT – “US OIL DEPENDENCY--THE NEW WEAPON OF MASS DISRUPTION” United States Army Reserve 30 MAR 2007 DTIC) AK

The United States is the wealthiest country in the world, yet it is increasingly held hostage by its insatiable appetite for oil, the majority of which must be imported. Much of this imported oil comes from regions of the world that are hostile toward United States interests; oil-rich national leaders have and will continue to use oil against the United States as a weapon of mass disruption. Equally likely, nature can cause major disruptions to United States energy needs. Reducing the United States oil vulnerability serves two valuable purposes. First, those who might attempt to take advantage of the United States dependence on imported oil might think twice about using oil as a weapon if the United States has the capability to quickly and dramatically reduce its import requirements on an emergency basis. Second, having a plan in place to quickly and dramatically reduce oil consumption provides our strategic leaders with better options when dealing with natural disasters that negatively effect oil production, refining, and transportation flow within the United States.

## Impact – Rivals / Terror

### Oil dependency destroys military operations, funds terrorism, and empowers hostile global rivals

Sandalow 8(David Sandalow, Energy & Environment Scholar at Brookings, former secretary of state for oceans, environment, science, and senior director on the staff of the National Security Council during the Clinton administration. “Ending Oil Dependence”. The Brookings Institute. <http://www.brookings.edu/~/media/Files/Projects/Opportunity08/PB_Energy_Sandalow.pdf>) AK

The United States is in a long war. Islamic fundamentalists struck our shores and are determined to do so again. Oil dependence is an **important cause** of this threat. For example, according to Brent Scowcroft, National Security Adviser at the time of the first Gulf War, “…what gave enormous urgency to [Saddam’s invasion of Kuwait] was the issue of oil.” After removing Saddam from Kuwait in 1991, U.S. troops remained in Saudi Arabia where their presence bred great resentment. Osama bin Laden’s first fatwa, in 1996, was titled “Declaration of War against the Americans Occupying the Land of the Two Holy Places.” Today, deep resentment of the U.S. role in the Persian Gulf is a powerful jihadist recruitment tool. Resentment grows not just from the war in Iraq, but also from our relationship with the House of Saud, the presence of our forces throughout the region, and more. Yet the United States cannot easily extricate itself from this contentious region. The Persian Gulf has half the world’s proven oil reserves, the world’s cheapest oil, and its only spare production capacity. So long as modern vehicles run only on oil, the Persian Gulf will remain an indispensable region for the global economy. Furthermore, the huge flow of oil money into the region helps finance terrorist networks. Saudi money provides critical support for madrassas promulgating virulent anti-American views. Still worse, diplomatic efforts to enlist Saudi government help in choking off such funding, or even to investigate terrorist attacks, are hampered by the priority we attach to preserving Saudi cooperation in managing world oil markets. This points to a broader problem—oil dependence **reduces the world community’s leverage** in responding to threats from oil-exporting nations. Today, the most prominent threat comes from Iran, whose nuclear ambitions could further destabilize the Persian Gulf and put powerful new weapons into the hands of terrorists. Yet efforts to respond to this threat with multilateral sanctions have foundered on fears that Iran would retaliate by withholding oil from world markets. In short, three decades after the first oil shocks— and a quarter-century after the humiliating capture of U.S. diplomats in Tehran—we remain hostage to our continuing dependence on oil. Finally, oil dependence jeopardizes the safety of our men and women in uniform. Fuel convoys are highly vulnerable to ambush. Diesel generators display an easily detected heat signature. In many Army deployments, oil makes up a staggering 70 percent of the tonnage that must be transported to the front lines. In June 2006, Major General Richard Zilmer, head of the Multi-National Force in Al-Anbar Province, Iraq, made a “Priority 1” request for renewable energy technologies on the front lines. Zilmer’s memo declared that, without renewable power, U.S. forces “will remain unnecessarily exposed” and will “continue to accrue preventable . . . serious and grave casualties.”

### Oil dependency creates a cycle of intervention wars and terrorism

**Collina 5** (Tom Z. Collina, Executive Director of 20-20Vision; testimony in front of Committee on Foreign Relations Subcommittee on Near Eastern and South Asian Affairs United States Senate “Oil Dependence and U.S. Foreign Policy: Real Dangers, Realistic Solutions”. October 19, 2005 <http://www.globalsecurity.org/military/library/congress/2005_hr/051020-collina.pdf>) AK

The more dependent we are on foreign oil, the more troops we will deploy abroad to protect that oil. This creates resentment and invites terrorist attacks on our troops—and on oil supply routes. The U.S. troop presence in Saudi Arabia during the first Gulf War was a major contributor to the rise of Islamic terrorist groups like Al Qaeda, and U.S. troops in Iraq are now a main justification for the insurgency there. We must break our oil habit so we can reduce our military footprint abroad. Moreover, much of the money we pay for our imported oil goes to countries or groups that support terrorism. It is no accident that 15 of the 19 September 11 hijackers came from Saudi Arabia, as does Osama Bin Laden. It is time we stop funneling money to our own enemies. According to a 2003 article in Foreign Affairs: “It is…increasingly clear that the riches from oil trickle down to those who would do harm to America and its friends. If this situation remains unchanged, the United States will find itself sending soldiers into battle again and again, adding the lives of American men and women in uniform to the already high cost of oil.

## Impact – Iran

### Iran uses oil as a justification to challenge the US – there is no way we can stop them without destroying our economy – destroys heg in either scenario

Cohen 7(Ariel Cohen, Ph.D., is Senior Research Fellow in Russian and Eurasian Studies and International Energy Security in the Douglas and Sarah Allison Center for Foreign Policy Studies, a division of the Kathryn and Shelby Cullom Davis Institute for International Studies, at The Heritage Foundation. Testimony before the House Foreign Affairs Committee “The National Security Consequences of Oil Dependency” <http://s3.amazonaws.com/thf_media/2007/pdf/hl1021.pdf>) AK

The leadership of the Islamic Republic of Iran is engaged in operational planning to intercept the flow of oil in the Gulf. Despite Iranian President Mahmoud Ahmadinejad’s earnest and ongoing attempt to project the image of an irrational leader of what international relations theorists have called a “crazy state,” many analysts have yet to recognize fully the dire ramifications of Iran’s professed intention to develop a nuclear weapons program. If diplomacy fails, Iran’s pursuit of nuclear weapons will leave the U.S. and its allies with few choices, all of them unpalatable. In June 2006, Iran’s oil minister cautioned, “If the country’s interests are attacked, we will use all our capabilities, and oil is one of them.” Perhaps most alarming are the remarks of Iran’s Supreme Leader Ayatollah Ali Khamenei in the same month: “If the Americans make a wrong move toward Iran, the shipment of energy will definitely face danger, and the Americans would not be able to protect energy supply in the region.” The economic consequences of a military strike on Iran’s nuclear facilities to the world energy market would likely be significant, if not disastrous. Immediately following military action, according to a Turkish assessment, uncertainty about Iran’s ability to sustain oil production at the current level of 4 mbd could drive oil prices above $80 per barrel.9 If Iran retaliated and escalated by shutting down the Strait of Hormuz, which would merely require placing anti-ship mines in the strait,10 the temporary loss of more that 15 million barrels of oil to the international market could drive oil prices above $83 per barrel, the historic height of the 1970s (adjusted for inflation).11 In fact, a recent Heritage Foundation war game and economic study speculated that oil prices could go as high as $120/barrel for a limited time. Allowing Iran to join the nuclear club introduces the possibility of Iranian interference throughout the Middle East, especially given Iran’s proximity to so many of the world’s largest oil fields. The large Iranian military, if amply supplied by Russia and China, would be in a position to dominate the Persian Gulf under a nuclear umbrella, particularly if U.S. ground forces were pinned down in Iraq. Currently, Iran enjoys the support of some Shi’a forces in Iraq, especially Muqtada al-Sadr’s Mahdi Army, and in the Shi’ite-populated Ash Sharqiyah (Eastern) Province of Saudi Arabia. This could facilitate a pro-Iranian Shi’a takeover of some of the largest oil fields in the world. In a worst-case scenario, a nuclear Iran could threaten the United Arab Emirates and Kuwait. If this were to happen, the Islamic Republic could quickly secure a sizable part of the world’s oil supply, bringing the nuclear-armed militant Iran close to a virtual monopoly over the world’s energy market. Iran’s Dangerous Arsenal. Since the 1990s, Iran has been upgrading its military with a host of new weapons from China, Russia, and North Korea, as well as with weapons manufactured domestically. Today, Iran boasts an arsenal of Iranian-built missiles based on Russian and Chinese designs that are difficult to counter both before and after launch. Of particular concern are reports that Iran has purchased the SS-N-22 Moskit/Sunburn anti-ship missile. The supersonic Sunburn is specifically designed “to reduce the target’s time to deploy selfdefense weapons” and “to strike ships with the Aegis command and weapon control system and the SM-2 surface-to-air missile.”12 Iran is also well stocked with older Chinese HY-1 Seersucker and HY-2 Silkworm missiles and the more modern C-802 anti-ship cruise missile (ASCM)—designs that Iran has successfully adapted into their own Ra’ad ad Noor ASCMs. Iran has a large supply of anti-ship mines, including modern mines that are far superior to the simple World War I–style contact mines that Iran used in the 1980s. They include the Chinese designed EM-52 “rocket” mine, which remains stationary on the sea floor and fires a homing rocket when a ship passes overhead. In the deep waters in the Strait of Hormuz, such a weapon could destroy ships entering or exiting the Persian Gulf. According to one expert, Iran “can deploy mines or torpedoes from its Kilo-class submarines, which would be effectively immune to detection when running silent and remaining stationary on a shallow bottom just outside the Strait of Hormuz.”13 Iran could also deploy mines by helicopter or small boats disguised as fishing vessels. Mines are only one of a host of potential Iranian threats to shipping in the Persian Gulf. The naval commandos of Iran’s Revolutionary Guards are trained to attack using fast attack boats, mini-submarines, and even jet skis. The Revolutionary Guards also have underwater demolition teams that are trained to attack offshore oil platforms and other facilities. Finally, Tehran could use its extensive terrorist network in the region to sabotage oil pipelines and other infrastructure or to strike oil tankers in port or at sea. Consequences of a Supply Disruption in the Persian Gulf. With supplies growing and the price of oil falling, there has been a shortsighted tendency to underplay the threat posed by a major disruption in the Persian Gulf. Although oil prices fell precipitously after the outbreak of the Iran–Iraq War, it is important to remember that global energy needs are much different today from what they were during the 1980s. Oil production is at record levels, but global demand has increased significantly, especially in the past 15 years. Under today’s conditions, the slightest disruption could drive oil prices back up toward historic levels.

### Oil dependency directly and indirectly fuels terrorism and gives massive oil revenue to Iran

Lefton 10 (Rebecca, researcher for Progressive Media at American Progress, master's degree in public policy from the Harris School of Public Policy at the University of Chicago. Center for American Progress. “Oil Dependence Is a Dangerous Habit” January 2010 <http://www.americanprogress.org/issues/2010/01/pdf/unstable_oil.pdf>) AK

The United States imported 4 million barrels of oil a day—or 1.5 billion barrels total— from “dangerous or unstable” countries in 2008 at a cost of about $150 billion. This estimate excludes Venezuela, which is not on the State Department’s “dangerous or unstable” list but has maintained a distinctly anti-American foreign and energy policy. Venezuela is one of the top five oil exporters to the United States, and we imported 435 million barrels of oil from them in 2008. As a major contributor to the global demand for oil the United States is paying to finance and sustain unfriendly regimes. Our demand drives up oil prices on the global market, which oftentimes benefits oil-producing nations that don’t sell to us. The Center for American Progress finds in “Securing America’s Future: Enhancing Our National Security by Reducing oil Dependence and Environmental Damage,” that “because of this, anti Western nations such as Iran—with whom the United States by law cannot trade or buy oil—benefit regardless of who the end buyer of the fuel is.” Further, the regimes and elites that economically benefit from rich energy resources rarely share oil revenues with their people, which worsens economic disparity in the countries and at times creates resource-driven tension and crises. The State Department cites oil-related violence in particular as a danger in Nigeria, where more than 54 national oil workers or businesspeople have been kidnapped at oil-related facilities and other infrastructure since January 2008. Attacks by insurgents on the U.S. military and civilians continue to be a danger in Iraq. Our oil dependence will also be increasingly harder and more dangerous to satisfy. In 2008 the United States consumed 23 percent of the world’s petroleum, 57 percent of which was imported. Yet the United States holds less than 2 percent of the world’s oil reserves. Roughly 40 percent of our imports came from Canada, Mexico, and Saudi Arabia, but we can’t continue relying on these allies. The majority of Canada’s oil lies in tar sands, a very dirty fuel, and Mexico’s main oil fields are projected dry up within a decade. Without reducing our dependence on oil we’ll be forced to increasingly look to more antagonistic and volatile countries that pose direct threats to our national security.

## Impact – Economy

**Oil is the biggest internal link to the economy – empirically proven**

**SAFE 6** (Securing America`s Future Energy – nonpartisan organization dedicated to reducing America’s dependence on oil by educating policymakers and advocating for comprehensive energy reform. “Oil Dependence: A Threat to U.S. Economic & National Security” <http://www.secureenergy.org/sites/default/files/155_Briefing-OilDependence.pdf>) AK

According to the International Energy Agency’s World Energy Outlook 2004, the world’s increased dependence on oil from unstable regions means that the “vulnerability to a price shock induced by oil-supply disruption will increase.” Essentially, oil dependence means that the condition of the global economy hinges on the ability of oil producers to keep the oil flowing. Demand for oil is “demand inelastic” because there are no ready substitues for oil and consumers have little flexibility to switch to other fuels for their daily oil consuming activities (such as transportation). When this reliance on oil is combined with tight supply conditions and growing oil demand, even relatively small shortages in supply can lead to sudden and large rises in the price of oil and have wide ranging ramifications for the economy. (As a rule of thumb, every 10% increase in the price of oil lowers U.S. GDP growth by up to 0.1 percentage points.) As Alan Greenspan noted before the Joint Economic Committee in April in 2002, “all economic downturns in the United States since 1973... have been preceded by sharp increases in the price of oil.” Numerous plausible events could interrupt global oil supplies and send prices sharply higher, threatening the stability of the global economy: Saudi Arabia is rife with terrorist threats and political tensions. Though the Kingdom has improved the security of its energy infrastructure since a wave of violence that began in May 2003, great concern remains. Two-thirds of Saudi oil output is processed in one huge facility (Abqaiq), the vast majority of Saudi exports are shipped from one of three terminals (Ras Tanura, Ras al-Ju’aymah, and Yanbu), and more than 50% of reserves are held in just eight fields, including the super giant Ghawar field, the largest in the world, which accounts for about 50% of Saudi Arabia’s total oil production capacity.12 Iran, the world’s fourth largest oil producer and exporter, has threatened to use the “oil weapon” to retaliate again action taken in response to its nuclear program. Nigeria is the site of ongoing civil conflict. In March of 2003, oil companies removed staff and suspended production in the Niger Delta, shutting in 10-20% of the country’s production. In September of 2005, Chevron temporarily shut down a pumping station and Shell evacuated personnel due to threats from local militia. In Iraq, oil facilities are a favorite target of the insurgency. There is also fear that violence could spill over into neighboring countries. Venezuela’s president frequently threatens to “cut off the oil,” and draws attention to the likely economic consequences for the U.S. In late-2002 and early-2003, labor strikes and general unrest reduced Venezuela’s output by more than 60 percent. Al Qaeda calls oil “the artery of the life of the crusader nation” and is actively targeting the vast and vulnerable oil supply chain. In Russia, the world’s second largest producer and exporter, uncertainty remains in the wake of the Yukos affair and other recentralization efforts. FSU states are the site of frequent instability (e.g. revolutions in Georgia, Ukraine, Uzbekistan), ethnic conflict, and rampant corruption. The precarious balance between supply and demand will continue to strain the system and infrastructure will always be vulnerable to natural disasters. Indeed, hurricanes were responsible for the single largest losses of energy output in 2004 (Ivan) and 2005 (Katrina). History provides ample evidence of the potential economic consequences of oil dependence. From 1970-2000, oil shocks are estimated to have cost the U.S. economy an estimated $7 trillion (in 1998 dollars.)13 In 1973, the Arab oil embargo had a macroeconomic effect akin to those that would result from a simultaneous increase in consumer and businesses taxes. Consumption and investment slowed everywhere as the world economy was thrown into recession; Roughly a year after the embargo had begun, real gross national product (GNP) had declined at a rate of 7.5% per annum.14 Schools and offices were closed to save on heating oil and factories were forced to lay off workers and cut production; Current account deficits soared and central banks cut interest rates to encourage growth; In the aftermath of the oil shock associated with the Iranian Revolution in 1979, quarterly GDP growth in the following year remained low and decreased by as much as 7.8 percent in the second quarter of 1980 (annualized in 2000 dollars). Oil prices spiked and American consumers switched in droves to purchasing smaller, imported cars, causing the U.S. auto industry to suffer tremendously.15 The doubling of oil prices between 2003 and 2005 had a stalling effect on American employment and wage growth. On the whole, however, the economy was resilient because it was in a better position to weather high oil prices than in the past. Rising prices cause less damage today because the U.S. economy is half as energy intensive as it was in the 1970s, meaning it takes half as many Btu’s of energy to produce $1 of GDP. The moderate prices of other goods, falling long-term interest rates and rising home values also made it easier to absorb higher energy prices. Moreover, prices increased gradually, whereas an abrupt price spike would have had a much greater impact. However, given the tight balance of today’s market, even a modest supply disruption could result in a **dramatic rise** in the price of oil.

### Oil dependence sends American jobs and money overseas – plan is key to economic growth

Lefton 10 (Rebecca, researcher for Progressive Media at American Progress, master's degree in public policy from the Harris School of Public Policy at the University of Chicago. Center for American Progress. “Oil Dependence Is a Dangerous Habit” January 2010. <http://www.americanprogress.org/issues/2010/01/pdf/unstable_oil.pdf>) AK

The United States has an opportunity right now to reduce its dependence on foreign oil by adopting clean-energy and global warming pollution reduction policies that would spur economic recovery and long-term sustainable growth. With a struggling economy and record unemployment, we need that money invested here to enhance our economic competitiveness. Instead of sending money abroad for oil, investing in clean-energy technology innovation would boost growth and create jobs. Reducing oil imports through clean-energy reform would reduce money sent overseas for oil, keep more money at home for investments, and cut global warming pollution. A Center for American Progress analysis shows that the clean-energy provisions in the American Recovery and Reinvestment Act and ACES combined would generate approximately $150 billion per year in new clean-energy investments over the next decade. This government-induced spending will come primarily from the private sector, and the investments would create jobs and help reduce oil dependence. And by creating the conditions for a strong economic recovery, such as creating more finance for energy retrofits and energy-saving projects and establishing loans for manufacturing low-carbon products, we can give the United States the advantage in the clean energy race. Investing in a clean-energy economy is the clear path toward re-establishing our economic stability and strengthening our national security.

### US economy completely dependent upon oil – two-thirds of our trade deficit comes from importing it

Fitzsimmons 10 (Michael Fitzsimmons, Journalist, Seeking Alpha–Investment Network. "Foreign Oil Dependency: The Root Cause of America`s Economic Pain”. <http://seekingalpha.com/article/238920-foreign-oil-dependency-the-root-cause-of-america-s-economic-pain>) AK

Despite all the grumbling by American economists about the Chinese keeping a lid on the value of the Renminbi (yuan), it is not the primary source of economic pain in America today. For this reason, Ben Bernanke's "QE2" policy (i.e. printing money) will not be successful because it does not attack the root cause of U.S. economic weakness. What is the root cause of American economic pain, and how can I make such a confident statement? The U.S. Commerce Department reported September 2010's trade deficit to be $44 billion dollars. During that month, crude oil averaged around $75/barrel and the U.S. imported about 12,000,000 barrels/day. This means the September 2010 monthly bill for oil imports was roughly $27 billion dollars. The point is this: out of a $44 billion dollar monthly trade deficit, $**27 billion of that was for one commodity alone**. Unfortunately for the U.S., it happens to be the most strategic commodity of all: **OIL**. Put another way, imported oil made up 62% of the U.S. monthly trade deficit. This is not an aberration - it goes on month after month, year after year. And as the price of oil goes up, so too does this problem. It is quite simply draining away the wealth of America. We are burning it up in our cars and trucks. So while I have spent the last 5 years trying to convince Americans and American policymakers that natural gas transportation was the solution to the problem, I realize now the real problem is that the American Congress, as well as its economists and financial media, are in complete denial about the imported oil crisis. Everyone knows the first step to *solving* a problem is to **understand** the problem. And this is why the Federal Reserve and American economists will fail in their attempts to revitalize the U.S. economy. They simply refuse to own up to the blatantly obvious fact that the American economy is built on a very badly constructed foundation: it is at the mercy of foreign oil to power it. Further, the problem is going to get much worse before it gets better. I am a firm believer that worldwide oil production will not keep pace with worldwide oil demand given a functioning worldwide economy. What we will see in the future is not very hard to predict: - the American economy will begin to strengthen and gather steam - oil prices will rise as oil demand increases with the strengthening economy - the American economy will peter out as high gasoline prices pummel the consumer - inflation, higher unemployment, higher fiscal and trade debts will follow - the currency will, over the long haul, continue to weaken In other words, the American economy is now completely dependent on the price of the most strategic commodity of all (oil) and the fact that it must import 65% of its consumption.

### Oil dependence kills jobs, our trade balance, and costs billions in resource wars in the Middle East

Williford 10(Sam Williford, graduated from the College of Charleston worked for Senator Robert Ford for Congressman John Spratt

November 9, 2010 “Foreign Oil Dependency Crippling U.S. Economy” ECONOMY IN CRISIS. <http://www.economyincrisis.org/content/foreign-oil-dependency-crippling-us-economy>) AK

Mired in wars to protect our oil supply, faced with high energy costs, and confronted by a massive trade imbalance, reducing our dependency on foreign oil would help stimulate the economy. "Our oil problems are only going to get worse. Our trade balance is only going to get worse. So we have to slow the growth of U.S. oil consumption, particularly imported oil consumption," said former Rep. Sherwood Boehlert according to [testimony (pdf file)](http://archives.energycommerce.house.gov/reparchives/108/Hearings/05032006hearing1854/Boehlert.pdf) given to the Energy and Commerce Committee in 2006. During the first six months of 2010, crude oil consumption averaged 18.9 million barrels per day. Every year oil imports account for hundreds billions of dollars sent to foreign countries. In fact, energy imports account for about one-fourth of the trade deficit. Money being sent overseas is not just dangerous for the economy. For example, when Dubai tried to buy several ports in 2006, it was proven that their money was not being used to buy American goods, but rather America itself. In states such as Mississippi, consumers spend up to 6.35 percent of their income on gasoline alone, according to a report by the National Resources Defense Council. "However, many states are still taking few, if any, of the steps listed in this report to reduce their oil dependence," study co-founder Elizabeth Hogan said. The war in Iraq has already cost this nation trillions of dollars and over 5,000 lives. That is money that could be spent on improving infrastructure or simply saved to reduce our debt. “Dependence on imported oil, particularly from the Middle East, has become the elephant in the foreign policy living room, an overriding strategic consideration composed of a multitude of issues,” said Lt. Col. James Amidon (USAF). With no need for foreign oil, our obligations in the Middle East would be lessened. Any solution would and should require American production for our energy, otherwise we are simply substituting dependence on foreign oil, with dependence on foreign creation of necessary machinery and parts. Done properly, such a movement would be a boon to the struggling manufacturing and agricultural industries, whether we use solar panels, wind turbines, nuclear power plants, diesel engines, electric cars and/or biofuels. Smart growth and public transportation in cities is another option. There is no single magic bullet solution but a combination of technologies can achieve this goal. While by no means an easy task, the same nation that put a man on the moon can surely accomplish such a necessary task that will spur innovation, create jobs and reduce our trade deficit. Energy created in this nation would keep money at home, keep people employed and keep our military out of foreign resource wars.

### Volatility of oil can destroy our economy

Sandalow 8(David Sandalow, Energy & Environment Scholar at Brookings, former secretary of state for oceans, environment, science, and senior director on the staff of the National Security Council during the Clinton administration. “Ending Oil Dependence”. The Brookings Institute. <http://www.brookings.edu/~/media/Files/Projects/Opportunity08/PB_Energy_Sandalow.pdf>) AK

**Oil dependence exposes the U.S. economy to the volatility of world oil markets.**Price increases can occur suddenly and, because there are no widely available substitutes for oil, consumers and businesses may be unable to respond by changing consumption patterns. At the national level, the climb in oil prices during the past few years has imposed considerable costs. Between summer 2003 and summer 2006, world oil prices rose from roughly $25 per barrel to more than $78 per barrel. Each $10 increase requires roughly $50 billion of additional foreign payments (approximately 0.4 percent of GDP) per year. In 2006, U.S. foreign payments for oil were more than $250 billion.

### Dependence on oil exacerbates economic crisis – kills GDP

Cooper 11 (James Cooper, writer, The Fiscal Times. “When Oil Prices Double, Recession Often Follows”. April 25, 2011. <http://www.thefiscaltimes.com/Columns/2011/04/25/When-Oil-Prices-Double-Recession-Often-Follows.aspx>) AK

There are plenty of risks in the economic outlook right now, including global supply disruptions following the multiple disasters in [Japan](http://www.thefiscaltimes.com/Articles/2011/04/13/US-Economy-Japan-Crisis-is-Taking-a-Toll.aspx" \t "_self), [sovereign debt](http://www.thefiscaltimes.com/Blogs/Debt-Watch/2011/02/11/Debt-Watch-The-G20-Should-Ride-to-Europes-Rescue.aspx" \t "_self) problems in Europe, [budget gridlock](http://www.thefiscaltimes.com/Articles/2011/04/19/Interest-Rate-Fears-Rise-as-Debt-Limit-Deal-Fades.aspx" \t "_self) in the U.S., and [China’s inflation](http://www.thefiscaltimes.com/Columns/2011/04/22/The-Next-China-A-Powerful-Consumer-Society.aspx" \t "_self) and rate hikes. What economists are most worried about, though, is oil. West Texas Intermediate crude ended above $112 per barrel in New York trading Thursday before the Easter break. Brent crude, the European benchmark, was just over $124. The average price for U.S. gasoline, at $3.85 per gallon on Friday, continues its march toward the $4.11 peak hit in 2008. Already, rapid growth in emerging markets in Asia and South America is pressuring tight global oil supplies. That’s what pushed oil prices to $147 in 2008, adding to the problems in the U.S. economy. The Paris-based International Energy Agency in its April report estimated that effective spare production capacity within OPEC, which supplies about 40 percent of the world’s oil, stands at 3.91 million barrels per day. Based on OPEC’s March production of 29.2 million barrels a day, that means OPEC is producing at just over 88 percent of capacity – leaving a thin margin close to the level that helped drive oil prices up in the previous decade. The turmoil in Libya has already taken most of the country’s 1.7 million barrels per day off the market, and any further supply losses would be acutely felt. How would oil in the $140-$150 per barrel range play out? Economists say much would depend on the speed of the rise. In the U.S., a spike to that range over the narrow space of a quarter would cause a sharp pullback in consumer spending, mainly on high-priced discretionary items such as cars and home goods. The surge would generate ripple effects throughout the economy, including outsized impacts on transportation, distribution, and construction, while increasing the chance of a new [recession](http://www.thefiscaltimes.com/Articles/2011/02/24/Oil-Soars-Stocks-Plunge-Fueling-Recession-Fears.aspx" \t "_self). The recent price rise has already pushed up U.S. inflation to an annual rate of 6.1 percent from December to March, cutting [spending](http://www.thefiscaltimes.com/Columns/2011/04/11/Consumer-Spending-Slowdown-Threatens-Recovery.aspx" \t "_self) growth sharply last quarter and hammering consumer confidence. In the U.S., the 40 percent spike in both crude oil and gasoline over the past six months has already wrecked previously upbeat forecasts for U.S. growth and [inflation](http://www.thefiscaltimes.com/Articles/2011/03/02/Inflation-Rears-its-Ugly-Head-as-Gas-and-Food-Prices-Rise.aspx" \t "_self) for the first half of 2011. Some economists believe first-quarter GDP growth, to be reported on Apr. 28, dipped below an annualized 2 percent rate and some have shaved nearly a full percentage point off their forecasts for the first half, compared to expectations only a few months ago. The worry now is that energy prices may not settle down as forecasters and policymakers have expected, which could add a further downdraft to growth and more updraft to inflation, not just in the U.S. but across the global economy. For now, most economic forecasts assume that the oil price spike so far is both manageable and transitory, knocking perhaps a few tenths of a percent off what global growth would otherwise have been this year and adding a few tenths to inflation. However, analysts don’t dismiss the possibility that the recent price rise could continue. Political unrest in the [Middle East and Africa](http://www.thefiscaltimes.com/Articles/2011/04/19/Libyan-Conflict-Cost-to-US-Soars-above-600-Million.aspx" \t "_self) could intensify and create structural changes in global oil supply, and the nuclear energy disaster in Japan could shift more energy demand toward oil. Say what you will about the various causes of past U.S. recessions, but economists at HSBC offer a sobering observation. Since the 1970s, a doubling of the real price of oil, which is the oil price relative to overall inflation, within the span of a year has almost always been followed by declining GDP. The two exceptions are the 1990-91 recession, when prices spiked but did not quite double, and 1987, when prices did double, followed by slower growth but no recession. Today, a doubling would require prices to rise to about $150.

### Oil volatility causes economic crisis – empirics prove

Goozner 11(Merrill Goozner, writer, The Fiscal Times. June 23, 2011 “Oil Dependency: The Real Threat to National Security”. <http://www.thefiscaltimes.com/Articles/2011/06/23/Oil-Dependency-The-Real-Threat-to-National-Security.aspx>) AK

Every economic downturn since the end of the Vietnam War has been preceded by a sudden steep increase in the price of oil. The [1974-75 recession](http://www.thefiscaltimes.com/Articles/2011/01/12/Man-the-Lifeboats-Oil-Prices-Could-Scuttle-Recovery.aspx" \t "_blank), for instance, followed hard on the heels of the formation of the Oil Petroleum Exporting Countries cartel (OPEC), which for the first time imposed sharply higher oil prices on global consumers. In 2000, oil hit the then unheard of price of $40 a barrel, and within months the dot-come bubble collapsed. Crude spiked over $100 a barrel in 2007, and a few months later the economy tanked. While there were usually other factors driving those downturns – in 2007-09 it was the subprime mortgage mess and resulting financial crisis, for instance – rising oil has always been seen as a major contributor to [economic slowdowns](http://www.thefiscaltimes.com/Columns/2011/04/25/When-Oil-Prices-Double-Recession-Often-Follows.aspx" \t "_blank), the equivalent of an externally imposed tax that was cause for geopolitical concern. But this time around, economic prognosticators are saying that the $[100-a-barrel oil prices](http://www.thefiscaltimes.com/Articles/2011/03/01/AP-Bernanke-Lasting-rise-in-oil-prices-pose-a-danger.aspx" \t "_blank) of the past two months – as long as they don’t spike into the stratosphere – will only have a transitory impact on growth , which is projected to be above 3 percent for the rest of this year. If their forecasts are right, the U.S. will have turned the corner into a new era, one where oil prices are permanently high but no longer derail the rest of the economy. Yet little of that new reality has influenced U.S. strategic thinking, which is still dominated by a mindset forged during World War II when global economic and military power depended on controlling access to sources of crude, and naval strategy was predicated on protecting the sea lanes that guaranteed shipments. How else to explain the 11 aircraft carrier battle groups in the $649 billion defense appropriations bill that is sailing through the House of Representatives this week, when no one else in the world has more than one? Oil is an internationally traded commodity where supply disruptions can occur at any time, in any region and for any reason. As the coordinated response by nations belonging to the International Energy Agency Thursday suggests, the more effective responses in the 21st century will be those that rely on market forces than on the 20th century mindset that uses military might and military-derived influence to guarantee access to increasingly scarce supplies. The much-maligned [President Jimmy Carter](http://www.stanleyfoundation.org/resources.cfm?id=281" \t "_blank) articulated the current strategic vision , which has remained essentially unchanged since his 1980 State of the Union Address. With the Iranian hostage crisis dominating the headlines, Carter declared that any “attempt by an outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force.” Yet in an era where [Canada is now the U.S.’s major source of foreign oil](http://www.eia.gov/dnav/pet/pet_move_neti_a_EP00_IMN_mbblpd_m.htm" \t "_blank), and rising competitors like China and India and Europe are the nations most dependent on the Middle East, the U.S. remains the sole guarantor of their uninterrupted supplies. “Everybody, including us, uses Middle Eastern oil,” said Lawrence Korb, a defense analyst at the Center for American Progress. “Why should we be the only ones guaranteeing the world access to that resource?” Ironically enough, a series of reports from a military-supported non-profit think tank laid out the rationale for the U.S. altering its strategic vision. Rising oil prices will be the new normal, the report suggested, since the years ahead will see demand from rapidly industrializing developing countries inexorably rising while supplies will remain limited due to the peak in global oil production. The Center for Naval Analyses Military Advisory Board in its 2009 report “[Powering America’s Defense](http://www.cna.org/reports/energy" \t "_blank)” identified dependence on oil as the threat to national security, not potential disruptions to supply. “Inefficient use and overreliance on oil burdens the military, undermines combat effectiveness, and exacts a huge price tag – in dollars and lives,” the report said. It called for dramatic reductions in the military’s use of fossil fuels, by switching to solar power and batteries to power field installations instead of using diesel generators. “The market for fossil fuels will be shaped by finite supplies and increasing demand,” the report said. “Continuing our heavy reliance on these fuels is a security risk.” That report followed a similar 2007 report on climate change that warned “destabilization driven by ongoing climate change has the potential to add significantly to the mission burden of the U.S. military in fragile regions of the world . . . Diversifying energy sources and moving away from fossil fuels where possible is critical to future energy security,” the report said. Former Vice Admiral Dennis McGinn, who recently retired from the Navy, served on the advisory board that issued both reports and recently took over the helm of the American Council on Renewable Energy, which brings together non-fossil-fuel energy producers and Fortune 500 companies to promote energy efficiency and clean-energy technologies. The 35-year military veteran, who began his career flying fighter jets over Vietnam, sees his new career as an extension of his work on long-term strategic policy conducted at the Naval War College during the 1990s. “You can’t have a viable national security strategy unless you’re economically strong and you can’t be economically strong as long as you’re dependent on energy coming from unstable parts of the world,” he said in an interview with The Fiscal Times. He has become a critic of the Obama administration’s slow [drawdown of U.S. troops in Iraq and Afghanistan](http://www.thefiscaltimes.com/Articles/2011/05/31/WP-War-Costs-May-Influence-Troop-Reductions.aspx" \t "_blank), whose presence in those two countries is projected to cost $119 billion next year. “The reason U.S. troops are over there is because we have to keep the lifeblood of the global economy flowing,” he said. “We’re taking the hits from IEDs to defend the global oil supply.” As he looks out at the year ahead, he has joined forces with environmentalists to push for higher fuel efficiency standards for the nation’s auto fleet. The administration proposal for a standard that will be put in place in 2016 is due this fall. “We’ve got to get off oil by using every gallon as efficiently as we can,” McGinn said.

## AT: US-Saudi Relations

### Arab spring proves relations low now

Boucek 6/21(Christopher Boucek, associate in the Carnegie Middle East Program where his research focuses on security challenges in the Arabian Peninsula and Northern Africa. June 21, 2011. “U.S.-Saudi Relations in the Shadow of the Arab Spring” http://www.carnegieendowment.org/experts/?fa=expert\_view&expert\_id=403)

We have seen the emergence of greater tensions between Washington and Riyadh as a result of the Arab Spring. This comes in large part because in Saudi Arabia there is a belief that Washington has not managed this process very well, doesn’t know what it’s doing, and is putting issues of political reform ahead of security and stability in the region. This is a part of the world where personal relationships, friendship, and loyalty are more important than anything else and we’ve seen the United States support the removal of former friends, Ben Ali in Tunisia and Hosni Mubarak in Egypt. The Saudis feel that there is a likelihood that this is not going to stop. Saudi Arabia and Saudi foreign policy generally loathe instability or uncertainty and that’s exactly what we see right now. Riyadh feels that the United States is more concerned about being on the right side of history, instead of standing by its friends and working to advance stability in the region—**this is very concerning to the Saudis**. Whereas the United States and Saudi Arabia historically differed over domestic Saudi political issues, the two countries usually agreed on foreign and regional policy issues. But increasingly, this is not the case. Increasingly it seems that Saudi Arabia looks out into the world and thinks that its foreign policy interests do not overlap with the United States and Washington’s security interests. Saudi Arabia is now in a position to pursue its **own interests**.

### Relations low now – Arab spring and Obama criticism

Xenakis 5/22 (BIG PEACE John, journalist, Technology Editor for InformationWeek magazine and CFO magazine. His education is in Mathematical Logic at MIT. “Saudi Arabia Advances Gulf Cooperation Council, Further Cuts U.S. Ties” <http://bigpeace.com/jxenakis/2011/05/22/saudi-arabia-advances-gulf-cooperation-council-further-cuts-u-s-ties/>)

A major realignment led by Saudi Arabia is in progress in the Mideast, triggered by the Arab uprisings and by anger in the Gulf states over President Obama’s responses, especially with respect to Iran. *Saudi King Abdullah*Saudi King Abdullah The incident that started the Saudis on the path to realignment was President Obama’s humiliation of long-time ally Hosni Mubarak, calling for him to step down in the face of the student protests. This raised the fear the Obama would also call for Saudi King Abdullah to step down, and led to the conclusion that the U.S. could no longer be trusted. (See [“11-Feb-11 News — Egypt ‘contagion’ threatens stability of Saudi Arabia.”](http://www.GenerationalDynamics.com/cgi-bin/D.PL?r=bpxx&xct=gd.e110211#e110211)) The uprising in Bahrain resulted in further sharp disagreements. The Saudis sent 1,000 troops into Bahrain to take over non-combat roles, so that the Bahraini security forces would be freed up to combat the protesters. Obama said that he opposed this move by the Saudis, and in his speech on Thursday, Obama condemned the “repressive military action.” For the Saudis and the other Gulf nations, human rights for the Bahrain protesters is not the issue. What IS the issue is the concern that Iran is trying to destabilize the entire region, and that the Obama administration either does not care about this threat or is not concerned about it. According to Nawaf Obaid, senior fellow at the King Faisal Center for Research and Islamic Studies, writing for the [Washington Post](http://www.washingtonpost.com/opinions/amid-the-arab-spring-a-us-saudi-split/2011/05/13/AFMy8Q4G_story.html) earlier this week: “A tectonic shift has occurred in the U.S.-Saudi relationship. Despite significant pressure from the Obama administration to remain on the sidelines, Saudi leaders sent troops into Manama in March to defend Bahrain’s monarchy and quell the unrest that has shaken that country since February. For more than 60 years, Saudi Arabia has been bound by an unwritten bargain: oil for security. Riyadh has often protested but ultimately acquiesced to what it saw as misguided U.S. policies. But American missteps in the region since Sept. 11, an ill-conceived response to the Arab protest movements and an unconscionable refusal to hold Israel accountable for its illegal settlement building have brought this arrangement to an end. As the Saudis recalibrate the partnership, Riyadh intends to pursue a much more assertive foreign policy, at times conflicting with American interests. … Iran’s efforts to destabilize its neighbors are tireless. As Riyadh fights a cold war with Tehran, Washington has shown itself in recent months to be an unwilling and unreliable partner against this threat. The emerging political reality is a Saudi-led Arab world facing off against the aggression of Iran and its non-state proxies. Saudi Arabia will not allow the political unrest in the region to destabilize the Arab monarchies — the Gulf states, Jordan and Morocco. In Yemen, the Saudis are insisting on an orderly transition of power and a dignified exit for President Ali Abdullah Saleh (a courtesy that was not extended to Hosni Mubarak, despite the former Egyptian president’s many years as a strong U.S. ally). … In Iraq, the Saudi government will continue to pursue a hard-line stance against the Maliki government, which it regards as little more than an Iranian puppet. In Lebanon, Saudi Arabia will act to check the growth of Hezbollah and to ensure that this Iranian proxy does not dominate the country’s political life. Regarding the widespread upheaval in Syria, the Saudis will work to ensure that any potential transition to a post-Assad era is as peaceful and as free of Iranian meddling as possible.

## AT: US-Russian Relations

### Tensions now – litany of disagreements

Voice of Russia 6/29(Russian news, “Hillary Clinton gives post-“reset” outlook.” <http://english.ruvr.ru/2011/06/29/52552669.html>)

There are a lot of really sharp corners in the two sides’ relations, namely the deadlock in negotiations on a global air defense system, disputes about the non-proliferation course in the context of the Iranian nuclear program, NATO operations in Libya, as well as US support for the Saakashvili regime and efforts to impose democracy in different parts of the world. However, interaction in Afghanistan and the signing of the new START Treaty show that the parties want to agree and cooperate rather than speak the language of ultimatums. They finally stopped living in a state of mutual nuclear deterrence. At the same time, controversial issues of cancelling the obsolete Jackson-Vanik amendment have not yet been solved. Another factor hampering a full-fledged dialogue in the military-political sphere is that the US and Russia take each other as potential rivals in their doctrines, Sergei Oznobishchev pointed out. "**There is almost nothing positive here**, which nevertheless does not prevent us from hopefully looking into the future. We are more and more frequently referring to each other as partners," Sergei Oznobishchev said in conclusion.

### Relations impossible – structural problems prevent genuine relations

Cohen 6/15 **--** Senior Research Fellow in Russian and Eurasian Studies and International Energy Policy in the Douglas and Sarah Allison Center for Foreign Policy Studies, a division of the Kathryn and Shelby Cullom Davis Institute for International Studies, at The Heritage Foundation (Ariel, “Reset Regret: U.S. Should Rethink Relations with Russian Leaders.” <http://www.heritage.org/Research/Reports/2011/06/Reset-Regret-US-Should-Rethink-Relations-with-Russian-Leaders>)

U.S.–Russian relations include issues such as human rights and Islamist extremism in Russia, the energy and sovereignty concerns of U.S. friends and allies, Iran, and nuclear nonproliferation. The Obama Administration cannot address these issues by pretending that Medvedev and his narrow circle of supporters wield the real power. In fact, it is the Putin group—which includes the key energy, military and security services officials, businessmen, and the leadership of the United Russia ruling party—that exercises the ultimate power. Now Putin, no great friend of America, is likely to move back from the Prime Minister’s office to the Kremlin in the spring of 2012, raising tough questions about Obama’s Russian policy. Putin publicly disagreed with Medvedev, his handpicked successor, on a number of key policy issues, many of them vital to U.S. interests. These included the role of freedom in the country, the legacy of Joseph Stalin (Putin called him “an effective manager”), and the collapse of the Soviet Union. The two also argued on modernization, Libya, and persecution of the former oil magnate Mikhail Khodorkovsky. Putin also supports “friendship” with China and Venezuela and good relations with Iran. At various points Putin accused the U.S. of supporting Islamist terrorists in North Caucasus in order to dismantle Russia, illegally intervening in Iraq, being responsible for the global economic recession, and toppling regimes in the Middle East through promotion of social media. Putin views modernization as primarily boosting military technology, pays lip service to the fight against corruption, and directly intervenes in prominent court cases. Putin formed his worldview in the KGB and by reading Russian nationalist philosophers. He famously considers the collapse of the Soviet Union “the greatest geopolitical catastrophe of the 20th century.” He also does not like or trust the United States. Ideological Chasm Beyond the two men’s competition for power lies a deep ideological chasm, which reflects a 150-year confrontation between the “Westernizers” and the authoritarian “Slavophiles”/Eurasianists, who want to make Russia a linchpin of a global confrontation with the Euro-Atlantic world. Without recognizing this schism, it is practically impossible for Western decision makers to understand the two Russian leaders, their worldviews, and their ambitions. Pro-Putin elites include the top officers of security services and the armed forces, the military-industrial complex, state company bosses, and a part of the business class. They are a mix of statists, imperialists, and nationalists. They support a future for Russia that is rooted in the imperial past and Christian Orthodoxy. Last month, worried about his own and his party’s declining popularity and anxious to outmaneuver Medvedev, Putin launched Popular Front, a political contraption that would consist of United Russia, women’s and environmental organizations, sympathetic businessmen, and trade unions. Determined to control the next Duma, Putin may allow communists and possibly Vladimir Zhirinovsky’s ultra-nationalists in the next Parliament. This may spell the end of the feeble multi-party system in Russia. Too Late for Damage Control While the White House has yet to publicly realize its errors regarding policy toward Russia, any damage control may be too little, too late: This April, while on a trip to Moscow, Vice President Joseph Biden invited Putin to visit Washington. As of this writing, Putin has not committed to a visit. Furthermore, naming Michael McFaul—an openly pro-Medvedev Putin critic and architect of the “reset” policy—as the next U.S. Ambassador to Moscow may not improve the relations with the Putin circle. Even before Putin returns to his Kremlin office, Russia is likely to demand U.S. concessions: joint controls and technology transfer for European missile defenses, the withdrawal of U.S. tactical nuclear weapons from Europe, refusing to abide by Conventional Forces in Europe Treaty, and sabotaging sanctions on Syria and Iran. Its relentless pressure on Ukraine continues. In the near future, the clampdown on political expression and the media are likely to exacerbate, while corruption and trampling of the rule of law will continue unabated. Reset the “Reset” The Obama Administration and Congress need to recognize that the “reset” with Russia, which requires huge payoffs for small results, is in dire need of a reassessment. The U.S. should pursue its national interests in relations with Moscow instead of chasing a mirage. The U.S. and Russia have mutual interests in opposing Islamic radicalism and terrorism, nonproliferation, counter-narcotics, boosting trade and investment, and expanding tourism, business, and exchanges. Russia can benefit from access to U.S. science—especially health sciences, technology, and investment—if Moscow improves its foreign and domestic policies. However, Congress and the Administration should not tolerate Russian mischief, either domestic or geopolitical. The U.S. should not shy away from articulating its priorities and values to its Russian partners—and play hardball when necessary.

### No tech cooperation – structural barriers

Financial Times 6/15 (“Foreign relations: Improved US ties point to a new era.” <http://www.ft.com/cms/s/0/7cf18c82-9623-11e0-8256-00144feab49a.html#axzz1QgOad6tS>)

The area where there may be the biggest scope for disappointment on the Russian side is the business relationship. Russia last year recast its foreign policy to be a servant of its biggest domestic policy priority – modernising the economy. As Mr Medvedev made clear with trips to the Massachusetts Institute of Technology and Silicon Valley during his US visit last year, Russia is in search of US technology and investment. But here, improved foreign policy relations can only achieve so much. A more constructive US government stance towards Russia is a necessary – but not sufficient – prerequisite for increased US investment flows. As commentators on both sides note, what is really needed to boost investment from the US and other western countries is improvement in the investment climate and the rule of law, and action to tackle Russia’s endemic corruption.

### ABM negotiation failures destroyed constructive relations

Fenenko 6/21(Alexi, RIA Nostovi, “”[The cyclical nature of Russian-American relations](http://en.rian.ru/valdai_op/20110621/164739508.html).”<http://en.rian.ru/valdai_op/20110621/164739508.html>)

The negotiations conducted over 8 - 9 June on anti-ballistic missile (ABM) issues as part of NATO-Russia Council can not be called successful. The parties involved did not come to a compromise about the format for Russia’s participation in the “European missile defense” project. This gave rise to a plethora of comments in the Russian and American media about the end of the “reset policy”. Russian-American dialogue, of course, will continue. But no one can deny that this is an alarming sign for Moscow-Washington relations. **The June setback** The “reset policy” crisis has been discussed in the Russian and U.S. media for nearly a year. Both the Kremlin and the White House reported progress: from START-III entering into force to expanded economic contacts. But after the Washington summit that brought presidents Barack Obama and Dmitry Medvedev together on 24 June 2010, there has been an increasingly dominant sense that the “reset” process is, somehow, going very wrong. The U.S. refusal to compromise over its ABM system, ongoing tensions over Iran, Libya and Georgia, Washington’s support for Japan in its territorial disputes with Russia, the U.S. media’s infatuation with the “Khodorkovsky case” -- all these are symptoms of a deeper problem. Now, the situation is different. The preamble to START-III focuses on the balance between strategic offensive and defensive weapons. Both parties, however, interpret this differently: the USA views it as an aspiration for the future, whereas Russia sees in it the need to reach agreement on ABM. Over the past year, Moscow has offered the United States two options for a potential compromise: either signing a special protocol to START-III or implementing the “European missile defense” project. Washington’s refusal to compromise on missile defense casts doubt over the idea that START-III (the main achievement of the two-year “reset policy”) stands any real chance of being implemented. Moscow and Washington, of course, will try to reach a compromise on ABM. But the purpose of the “reset policy,” i.e. building new partnerships and reviving relations between Russia and the United States, seems to be fading. Russian-American relations appear to have reverted to the traditional type, with issues relating to arms control comprising 80% of their agenda. Over the past two years the parties have failed to bring them to a new level.

## TAPI Bad – 2AC

### TAPI destroys Russia’s economy

Torbakov 1- former Regional Exchange Scholar at the Kennan Institute, Woodrow Wilson International Center for Scholars

(Igor, “TALIBAN DEFEAT REVIVES DEBATE ON TRANS-AFGHAN PIPELINE,” [http://www.eurasianet.org/departments/business/articles/eav121201.shtml](http://www.eurasianet.org/departments/business/articles/eav121201.shtml" \t "_blank))

The country most likely to suffer from the possible construction of pipelines in Afghanistan is Russia, currently a leading member of the anti-terrorism coalition, and a long-time sponsor of the Northern Alliance. Moscow has long been wary about the development of new Central Asian oil and gas export routes that do not go through Russian territory. There are some indirect signs that the idea of a trans-Afghan gas project is being revived. The United States and Great Britain have recently lifted economic sanctions against Afghanistan. This move, apprehensively notes Moscow economic publication [Rossiiskaya Biznes-Gazeta](http://www.rg.ru/bussines/), "can be the first harbinger of the US companies' intentions to re-join the trans-Afghan gas consortium." In late October, Turkmenistan's president, Saparmurat Niyazov, sent a letter to the UN leaders advocating construction of a pipeline bringing Turkmen gas to Pakistan's Arabian Sea ports across the Afghan territory. Seeking UN support for the project, Niyazov contended that this pipeline "will help rebuild this country [Afghanistan], normalize peaceful life and work of the Afghan people, and also accelerate socio-economic development of the entire adjacent region." Speaking at the newly refurbished Turkmen embassy in Moscow on November 30, Niyazov elaborated on his intentions. "We could sell to foreign markets about 120 billion cubic meters of gas annually, but we can not do this due to the lack of pipelines," he said. Niyazov went on to take a swipe at Russia: In reciting foreign investment statistics for 2001, the Turkmen strongman noted the lack of Russian investment. "Russia is nowhere to be seen not because they do not want to take part, but because they have problems, they themselves are looking for investments," Niyazov said. If the trans-Afghan gas project is realized, Moscow experts say, the Russian economy will face two unpleasant consequences. Firstly, Russian energy sector will lose Turkmen gas that is now being delivered to Russia and, in the long-term perspective, also Uzbek gas. That could amount to 25 billion cubic meters annually. Secondly, if Central Asian gas exports are directed south, across Afghanistan to the Indian Ocean, Russia will lose transit revenue. Russian experts reluctantly acknowledged the existence of a price incentive for Central Asia states to seek alternates to Russian routes. According to Rossiiskaya Biznes-Gazeta, Russia can pay maximum $38 per thousand cubic meters of Turkmen and Uzbek gas. At the same time, the potential importers of Central Asian gas in South Asia have recently confirmed that their minimal price per thousand cubic meters is up to $60, notes the newspaper. Even the most liberal Russian experts are ambiguous about a trans-Afghan pipeline. It "will surely give a substantial boost to the country's [Afghanistan's] development," concedes Alexei Malashenko, a leading Central Asia analyst. "However, in this case Turkmenbashi will gain too much leverage for control over the situation," adds Malashenko. "No one knows how he [Niyazov] might behave". According to Unocal officials, the company doesn't plan to get involved into Afghanistan again and has shifted its resources to other world regions. However, Moscow is suspicious that Unocal "tries to hide its true intentions," according to an editorial in the Russian daily Izvestia. A number of Russian observers tend to interpret the current US troop deployment and basing agreements with the Central Asian nations within the context of energy geopolitics. "The United States does not conceal the plans to establish its [military] bases in the region to secure the safety of energy transit routes," writes the [Kommersant](http://www.kommersant.ru/) daily. Another detail adds to the Kremlin's worries. Zalmay Khalilzad, an Afghan-American academic, recently was appointed in June as special assistant to President George W. Bush and senior director at the National Security Council for the Persian Gulf and southwest Asia and other issues. According to Philip Smith, director of the Center for Public Policy Analysis, "Zalmay is immensely influential in driving US policy toward Afghanistan." Four years ago, Khalilzad served as a liaison for Unocal in the trans-Afghan pipeline project. Moscow is likely to try to thwart the building of what the international oilmen call the "new Silk Road." There are two ways Russia may do this: by increasing its on-the-ground military presence in Afghanistan, and by wooing Niyazov. Russia seems to be already undertaking steps in both these directions. The Kremlin reportedly is offering Niyazov a 10-year deal covering Russian purchases of Turkmen gas and its export to third countries. Moscow analysts say that Russia may also offer Turkmenistan special quotas for deliveries of natural resources through the Russian transit network. In the military sphere, Defense Ministry officials are expanding Russian military participation in Afghanistan. Sources in Russia's defense ministry argue that there is a danger of "military-political vacuum" in Afghanistan that might "create conditions for the breaking of civil war."

### Russian economic decline causes nuclear war

Filger 9 (Sheldon, author and blogger for the Huffington Post, “Russian Economy Faces Disastrous Free Fall Contraction” http://www.globaleconomiccrisis.com/blog/archives/356)

In Russia historically, economic health and political stability are intertwined to a degree that is rarely encountered in other major industrialized economies. It was the economic stagnation of the former Soviet Union that led to its political downfall. Similarly, Medvedev and Putin, both intimately acquainted with their nation’s history, are unquestionably alarmed at the prospect that Russia’s economic crisis will endanger the nation’s political stability, achieved at great cost after years of chaos following the demise of the Soviet Union. Already, strikes and protests are occurring among rank and file workers facing unemployment or non-payment of their salaries. Recent polling demonstrates that the once supreme popularity ratings of Putin and Medvedev are eroding rapidly. Beyond the political elites are the financial oligarchs, who have been forced to deleverage, even unloading their yachts and executive jets in a desperate attempt to raise cash. Should the Russian economy deteriorate to the point where economic collapse is not out of the question, the impact will go far beyond the obvious accelerant such an outcome would be for the Global Economic Crisis. There is a geopolitical dimension that is even more relevant then the economic context. Despite its economic vulnerabilities and perceived decline from superpower status, Russia remains one of only two nations on earth with a nuclear arsenal of sufficient scope and capability to destroy the world as we know it. For that reason, it is not only President Medvedev and Prime Minister Putin who will be lying awake at nights over the prospect that a national economic crisis can transform itself into a virulent and destabilizing social and political upheaval. It just may be possible that U.S. President Barack Obama’s national security team has already briefed him about the consequences of a major economic meltdown in Russia for the peace of the world. After all, the most recent national intelligence estimates put out by the U.S. intelligence community have already concluded that the Global Economic Crisis represents the greatest national security threat to the United States, due to its facilitating political instability in the world. During the years Boris Yeltsin ruled Russia, security forces responsible for guarding the nation’s nuclear arsenal went without pay for months at a time, leading to fears that desperate personnel would illicitly sell nuclear weapons to terrorist organizations. If the current economic crisis in Russia were to deteriorate much further, how secure would the Russian nuclear arsenal remain? It may be that the financial impact of the Global Economic Crisis is its least dangerous consequence.

## TAPI Bad – Sino-Russia War

### TAPI allows China to receive gas from Central Asia

Blank 7 **-**Professor at the Strategic Studies Institute (Stephen Blank, “China’s Recent Energy Gains in Central Asia: What Do They Portend,” Central Asia-Caucasus Institute, 10/31/07, <http://www.cacianalyst.org/?q=node/4726>)

China has also recently shown an interest in reviving the old 1997 UNOCAL project called CentGas to pump gas from Turkmenistan through Afghanistan and Pakistan to India, the new name being the TAP or TAPI line. Inasmuch as Pakistan has discussed pipelines from it to China, such gas as may come to Pakistan from either the TAP line or the prospective IPI (Iran-Pakistan-India) pipeline could give China new opportunities for gas from Central Asia.

### Even the perception of competition for sales to China cause Russia to take preemptive military action

Blank 7**-**Professor at the Strategic Studies Institute (Stephen Blank, “China’s Recent Energy Gains in Central Asia: What Do They Portend,” Central Asia-Caucasus Institute, 10/31/07, <http://www.cacianalyst.org/?q=node/4726>).

These trends do not pass unnoticed in Moscow despite the strong Sino-Russian relationship. The Putin regime, notwithstanding its ties to China, has long known that China could become Moscow’s most dangerous economic competitor in Asia as a whole, not just Central Asia. Equally importantly, Russian firms and the government deeply resent any effort by Central Asian states to escape Muscovite control and sell energy to other consumers. Thus Rosneft has managed to gain consent to transfer oil through the Atasu-Alashankou pipeline this year which could reach an estimated 51.3 million barrels of oil. However, this does not assuage Russian anxieties about these deals. Russia clearly regards any oil and gas that goes from Central Asia to China as being at its expense, since in its heart of hearts, it believes that this energy is really Russia’s energy. Indeed, Putin and Defense minister Sergei Ivanov publicly stated some time ago that Russia could take preemptive military action to defend pipelines in Central Asia since the USSR, i.e. Moscow, had built them and paid for them. This resentment of Central Asian energy shipments to China occurs whether Kazakh, Uzbek, or Turkmen deals with Beijing are concerned. But ultimately there is not much Moscow can do, since not only China and Central Asian states want these deals, Washington too has never publicly opposed any of them, indicating its support for the diversification of Central Asian options while wanting to minimize China’s reliance on Russia and Iran. Indeed, China has been the biggest beneficiary of Washington’s pressure upon Iran in terms of energy deals with Iran.

Russia-China war leads to nuclear winter

Sharavin 1

Alexander Sharavin, 10-3-2001, Defense and Security

Chinese propaganda has constantly been showing us skyscrapers in free trade zones in southeastern China. It should not be forgotten, however, that some 250 to 300 million people live there, i.e. at most a quarter of China’s population. A billion Chinese people are still living in misery. For them, even the living standards of a backwater Russian town remain inaccessibly high. They have absolutely nothing to lose. There is every prerequisite for “the final throw to the north.” The strength of the Chinese People’s Liberation Army (CPLA) has been growing quicker than the Chinese economy. A decade ago the CPLA was equipped with inferior copies of Russian arms from later 1950s to the early 1960s. However, through its own efforts Russia has nearly managed to liquidate its most significant technological advantage. Thanks to our zeal, from antique MiG-21 fighters of the earliest modifications and S-75 air defense missile systems the Chinese antiaircraft defense forces have adopted Su-27 fighters and S-300 air defense missile systems. China’s air defense forces have received Tor systems instead of anti-aircraft guns which could have been used during World War II. The shock air force of our “eastern brethren” will in the near future replace antique Tu-16 and Il-28 airplanes with Su-30 fighters, which are not yet available to the Russian Armed Forces! Russia may face the “wonderful” prospect of combating the Chinese army, which, if full mobilization is called, is comparable in size with Russia’s entire population, which also has nuclear weapons (even tactical weapons become strategic if states have common borders) and would be absolutely insensitive to losses (even a loss of a few million of the servicemen would be acceptable to China). Such a war would be more horrible than the World War II. It would require from our state maximal tension, universal mobilization and complete accumulation of the army military hardware, up to the last tank or a plane, in a single direction (we would have to forget such “trifles” like Talebs and Basaev, but this does not guarantee success either). Massive nuclear strikes on basic military forces and cities of China would finally be the only way out, what would exhaust Russia’s armament completely. We have not got another set of intercontinental ballistic missiles and submarine-based missiles, whereas the general forces would be extremely exhausted in the border combats. In the long run, even if the aggression would be stopped after the majority of the Chinese are killed, our country would be absolutely unprotected against the “Chechen” and the “Balkan” variants both, and even against the first frost of a possible nuclear winter.

## TAPI Impossible

### Too many obstacles to TAPI

Dadwal 11– Research Fellow at the Institute for Defence Studies and Analysis, New Delhi

(Shebonti, “TAPI – Still a Distant Dream,” <http://www.idsa.in/idsacomments/TAPIStillaDistantDream_sdadwal_020511>, dml)

First, as in the case of the IPI project, the route of the pipeline remains controversial. The nearly 1,700 km pipeline will originate from Turkmenistan’s Daulatabad gas field, and transit some 730 km through Herat, Helmand and Kandahar in Afghanistan, to Quetta and Multan in Pakistan, and on to Fazilka in India. Given the continuing insurgency in Afghanistan, concerns over the security of the pipeline through that country remain, and will continue to persist. While the presence of NATO troops in Afghanistan may succeed in securing the route, how long can they be expected to remain in Afghanistan, and what will happen once they do withdraw? Now, with the assassination of Osama bin Laden, a withdrawal from Afghanistan by US troops can be expected, given that the mission in Afghanistan was to defeat al-Qaeda and, with bin Laden’s death, the mission can be said to be complete. Neither is the 800 km section of the pipeline in Pakistan any more secure. Part of the line will pass through Balochistan, where the insurgency has intensified. The fact that domestic pipelines through Balochistan are being blown up every other day, affecting supplies throughout the province, it is unlikely that an international project will be spared by the insurgents. Moreover, international sponsors and financiers would be unwilling to finance a project whose security is questionable. Thirdly, doubts persist over the sustainability of gas supplies from Turkmenistan. Given that Turkmenistan has signed agreements with both Iran and China to increase existing supplies to these markets, and is also the largest supplier of natural gas to Russia’s Gazprom, questions have arisen whether it will be able to meet its commitments for TAPI. Though Turkmenistan claims that its gas export potential has increased following the discovery of the giant South Yolotan field, which holds 212 trillion cubic feet of recoverable gas, approximately equal to 90 per cent of the US’ proven reserves, its TAPI partners have demanded third party certification of its claimed reserves. As per the agreement, Turkmenistan will supply 90 mmcmd of gas for TAPI, with 38 mmcmd each going to Pakistan and India and the rest to Afghanistan. Moreover, Turkmenistan’s gas sector suffers from several constraints, including lack of financial resources and technical capability to develop new projects. The country also lacks adequate pipeline network infrastructure to deliver gas to its markets, and continues to be dependent on Russia’s network for exports to the West. As a result, according to some experts, it is unlikely that it will be able to increase its export volumes substantially over the next 10 years. Finally, differences over the pricing of the gas as well as transit fees have arisen between India and Turkmenistan. The recent inter-ministerial meeting apparently ended in a stalemate, with India expressing its unwillingness to pay the price proposed by Turkmenistan, as it would be higher than the price of liquefied natural gas (LNG). According to reports, India is willing to pay about USD 12.67 per million metric British Thermal Units (mmBTU) of gas, while Turkmenistan is asking for around USD 14-15 per mmBTU. If India can import LNG more cheaply than the Turkmen gas, it would prefer to opt for the former.

### Pipeline impossible – weather and building conditions

Ibrahimov 9 -- PhD, Ankara University, Institute of Social Sciences, Department of International Relations (Rovshan Ibrahimov, October 31, 2009, “Trans-Afghan Pipeline: Will Ambitions Convert into the Reality,” http://www.energyresearches.org/articles/articles/85-articles/186-trans-afghan-pipeline-will-ambitions-convert-into-the-reality.html)

In addition to the problems of political nature, there are a number of technical difficulties. In particular, some 400 km pipeline will be held on mountainous terrain that will complicate construction, and subsequent control over the pipeline, especially in the winter seasons. In addition, in Afghanistan could complicate the transportation of pipes because of the lack of a railway that will also lead to costs of works. Still is question about source of financing for the project. None of the known financial institutions will agree to invest capital in such a costly and risky project. But the greatest problem could be that even after the construction of a pipeline from Turkmenistan could simply not have the necessary amount of natural gas for export in this direction. It is not a secret that virtually the entire export gas, which is about 50 billion cubic meters of gas sold by Russia. Moreover, Russia wants to increase imports from Turkmenistan. In addition, Turkmenistan signed a treaty on its gas deliveries to China and Iran, and also promised to export a certain amount of gas in a westerly direction to the European Union. Turkmenistan currently produces 60 billion cubic meters of gas, and if in the short term fails to drastically increase gas production, it will serve as the main reason that the draft would remain on paper.

## No TAPI Now

### Prices block construction

Khaleej Times 6/27 **–** UAE newspaper

(“Pakistan sees hope amid energy crisis,” <http://www.khaleejtimes.com/biz/inside.asp?xfile=/data/business/2011/June/business_June454.xml&section=business>, dml)

The TAPI project, supported by Manila-based Asian Development Bank, or ADB, World Bank and Washington, is undergoing its own convulsions. The latest reports, this week, are that TAPI could be in trouble because the buying countries —Afghanistan-Pakistan-India — are asking for uniform gas prices. Turkmenistan, however, is calling for separate bilateral agreements for each of the country, Pakistan’s Ministry of Petroleum and Natural Resources say. The proposed 1,640 kilometre long TAPI is designed to deliver 3.2 billion cubic feet per day (BCFD) of gas. Of this flow, Pakistan and India each plan to use 1.365 bcfd, while Afghanistan will get 0.l5 bcfd. ADB, reportedly, has agreed to provide the equity, for the project on behalf of Pakistan, to facilitate an early completion of the pipeline. At the just-concluded Manila round of negotiations between participants of TAPI, and ADB, Afghanistan, Pakistan and India, took the position that separate tariffs for each user country will have “huge political repercussions in each of the buying country.” There was also the question as to which country will pay the laie-packed price—the gas remaining in the pipeline? Turkmenistan insists this price has to be paid by the user countries, as is the case in other international deals.

### Afghan rider kills it

Jacob 6/18 **–** reporter for the Hindustan Times

(Jayanth, “Kabul rider on TAPI gas pipeline shocks Delhi,” <http://www.hindustantimes.com/Kabul-rider-on-TAPI-gas-pipeline-shocks-Delhi/Article1-711066.aspx>, dml)

Dealing a shock to New Delhi, Afghanistan has struck a strident position on the transit fee for gas that has serious implications for the ambitious Turkmenistan-Afghanistan-Pakistan-India (TAPI) gas pipeline. India was hoping that Kabul would at least accept the terms Pakistan had informally agreed for the Iran-Pakistan-India (IPI) pipeline on the transit cost. In the negotiations New Delhi said it would offer 25 cents per MMBtu — a unit to measure gas — the amount Pakistan “informally accepted” as transit fee for the IPI pipeline. But to New Delhi’s surprise, Kabul said they are not ready to accept any fixed transit fee and would prefer the transit cost being linked to the gas price. “We were hoping to settle the transit fee before getting to the tougher part of the gas price negotiation with Turkmenistan”, says a government official. Of the 1,680 TAPI pipeline, 735 km goes through Afghanistan. It passes through the tough terrains of Herat, Lakshkar Gah and Kandahar within Afghanistan, before it enters Pakistan to complete another 800 km. “First we have to agree on the transit fee, then the rest will follow”, pointed out an official. As per the understanding among the four countries in the gas pipelines project, Afghanistan has to clear the routes of all impediments, including any mines in proposed path of the pipeline. “Each country has to take all necessary measures for the safe passage of the pipeline through its territory”, says an official. The TAPI pipeline, which unlike the IPI, has the active support of the Americans. Washington’s vital interest in TAPI includes having an alternative route for Central Asian gas that will bypass the Russian pipelines’ networks. Joining this pipeline is also expected to underscore India’s position as a development partner to Afghanistan. Estimated to cost US$10 billion, the project is expected to supply 38 million standard cubic meters of gas to India.

## AT: Doesn’t Solve Transportation

### Hybrids coming – the plan quickens the transition

NSS 7

National Space Society, 2007, “Space Solar Power: An Investment for Today – An Energy Solution for Tomorrow,” NSS, http://www.nss.org/legislative/positions/NSS-SSP-PositionPaper.pdf

While electricity cannot power all our vehicles today, current hybrids will soon evolve into plug-in hybrids which will, in part, use electric energy from the grid. As batteries and fuel cells get better, the gasoline engine will play a smaller and smaller role in transportation. There are huge markets for power in cell phones, hybrid vehicles and laptops that can be expected to drive battery and fuel cell technology so that electricity will eventually power the cars of tomorrow – but not unless we can **generate enormous quantities of clean electrical energy**.

### Transition to hybrids solves transportation

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:   The SBSP Study Group found that in the long run, SBSP offers a viable and attractive route to decrease mankind’s reliance on fossil fuels, as well as provides a potential global alternative to wider proliferation of nuclear materials that will almost certainly unfold if many more countries in the world transition to nuclear power with enrichment in an effort to meet their energy needs with carbon neutral sources. To the extent mankind’s electricity is produced by fossil fuel sources, SBSP offers a capability over time to reduce the rate at which humanity consumes the planet’s finite fossil hydrocarbon resources. While presently hard to store, electricity is easy to transport, and is highly efficient in conversion to both mechanical and thermal energy. Except for the aviation transportation infrastructure, virtually all of America’s energy could eventually be delivered and consumed as electricity. Even in ground transportation, a movement toward plug‐in hybrids would allow a substantial amount of traditional ground transportation to be powered by SBSP electricity.

# \*Warming Extensions

## Link – Solves Warming

### It’s the most effective method for solving oil dependency, emissions and environmental collapse

NSS 8

August 2008, Solarpedia, <http://www.solaripedia.com/13/76/639/space-based_solar_power_diagram.html>, “Project”

Our National Security Strategy recognizes that many nations are too dependent on foreign oil, often imported from unstable portions of the world, and seeks to remedy the problem by accelerating the deployment of clean technologies to enhance energy security, reduce poverty, and reduce pollution in a way that will ignite an era of global growth through free markets and free trade. Senior U.S. leaders need solutions with strategic impact that can be delivered in a relevant period of time. In March of 2007, the National Security Space Office (NSSO) Advanced Concepts Office (“Dreamworks”) presented this idea to the agency director. Recognizing the potential for this concept to influence not only energy, but also space, economic, environmental, and national security, the Director instructed the Advanced Concepts Office to quickly collect as much information as possible on the feasibility of this concept. Without the time or funds to contract for a traditional architecture study, Dreamworks turned to an innovative solution: the creation on April 21, 2007, of an open source, internet-based, interactive collaboration forum aimed at gathering the world’s SBSP experts into one particular cyberspace. Discussion grew immediately and exponentially, such that there are now 170 active contributors as of the release of this report—this study approach was an unequivocal success and should serve as a model for DoD when considering other study topics. Study leaders organized discussions into five groups: 1) a common plenary session, 2) science & technology, 3) law & policy, 4) infrastructure and logistics, and 5) the business case, and challenged the group to answer one fundamental question: Can the United States and partners enable the development and deployment of a space-based solar power system within the first half of the 21st Century such that if constructed could provide affordable, clean, safe, reliable, sustainable, and expandable energy for its consumers?

### It solves – it’s the cleanest source of energy

Cowing 8 – MA in Biology

Keith, is trained as a biologist (M.A. and B.A. degrees) and editor for webmaster (“Transition Team and Solar Power Satellites,” <http://nasawatch.com/archives/2008/12/transition-team-and-solar-power-satellites.html>, 2008)

"A National Security Space Office (NSSO) study concluded in October of 2007 that "The magnitude of the looming energy and environmental problems is significant enough to warrant consideration of all options, to include ... space-based [solar power](http://nasawatch.com/archives/2008/12/transition-team-and-solar-power-satellites.html)." This NSSO report also concluded that SSP has "enormous potential for energy security, economic development, improved environmental stewardship, advancement of general space faring, and overall national security for those nations who construct and possess a (SSP) capability." We urge the next President of the United States to include SSP as a new start in a balanced federal strategy for energy independence and environmental stewardship,and to assign lead responsibility to a U.S. federal agency." [Let the sun shine in](http://www.economist.com/science/tq/displaystory.cfm?story_id=12673299), The Economist "Today it is not just robots in science-fiction tales who are believers in the wonders of space solar power (SSP); the idea also has a small but growing number of human adherents. The basic idea is simple.Light from the sun is the most abundant and cleanest source of energy available in the [solar system](http://nasawatch.com/archives/2008/12/transition-team-and-solar-power-satellites.html)."

### Alternative methods fail – no offense to takeouts it’s the most cost efficient, safe and environmental friendly option

NSS 7

August 2008, Solarpedia, <http://www.solaripedia.com/13/76/639/space-based_solar_power_diagram.html>, “Project”

Unlike oil, gas, ethanol, and coal plants, space solar power does not emit greenhouse gases. Unlike coal and nuclear plants, space solar power does not compete for or depend upon increasingly scarce fresh water resources. Unlike bio-ethanol or bio-diesel, space solar power does not compete for increasingly valuable farm land or depend on natural-gas-derived fertilizer. Food can continue to be a major export instead of a fuel provider. Unlike nuclear power plants, space solar power will not produce hazardous waste, which needs to be stored and guarded for hundreds of years. Unlike terrestrial solar and wind power plants, space solar power is available 24 hours a day, 7 days a week, in huge quantities. It works regardless of cloud cover, daylight, or wind speed. Unlike nuclear power plants, space solar power does not provide easy targets for terrorists. Unlike coal and nuclear fuels, space solar power does not require environmentally problematic mining operations. Space solar power will provide true energy independence for the nations that develop it, eliminating a major source of national competition for limited Earth-based energy resources. Space solar power will not require dependence on unstable or hostile foreign oil providers to meet energy needs, enabling us to expend resources in other ways. Space solar power can be exported to virtually any place in the world, and its energy can be converted for local needs — such as manufacture of methanol for use in places like rural India where there are no electric power grids. Space solar power can also be used for desalination of sea water. Space solar power can take advantage of our current and historic investment in aerospace expertise to expand employment opportunities in solving the difficult problems of energy security and climate change. Space solar power can provide a market large enough to develop the low-cost space transportation system that is required for its deployment. This, in turn, will also bring the resources of High development cost. Yes, space solar power development costs will be very large, although much smaller than American military presence in the Persian Gulf or the costs of global warming, climate change, or carbon sequestration. The cost of space solar power development always needs to be compared to the cost of not developing space solar power. The technologies and infrastructure required to make space solar power feasible include: Low-cost, environmentally-friendly launch vehicles. Current launch vehicles are too expensive, and at high launch rates may pose atmospheric pollution problems of their own. Cheaper, cleaner launch vehicles are needed. *Large scale in-orbit construction and operations*. To gather massive quantities of energy, solar power satellites must be large, far larger than the International Space Station (ISS), the largest spacecraft built to date. Fortunately, solar power satellites will be simpler than the ISS as they will consist of many identical parts. *Power transmission*. A relatively small effort is also necessary to assess how to best transmit power from satellites to the Earth’s surface with minimal environmental impact. All of these technologies are reasonably near-term and have multiple attractive approaches. However, a great deal of work is needed to bring them to practical fruition. In the longer term, with sufficient investments in space infrastructure, space solar power can be built from materials from space. The full environmental benefits of space solar power derive from doing most of the work outside of Earth's biosphere. With materials extraction from the Moon or near-Earth asteroids, and space-based manufacture of components, space solar power would have essentially zero terrestrial environmental impact. Only the energy receivers need be built on Earth. Space solar power can completely solve our energy problems long term. The sooner we start and the harder we work, the shorter "long term" will be.

### It’s the most beneficial solution to avoid increase in emissions and environmental issues – US leadership is key

NSS 7

August 2008, Solarpedia, <http://www.solaripedia.com/13/76/639/space-based_solar_power_diagram.html>, “Project”

The United States and the world need to find new sources of clean energy. Space Solar Power gathers energy from sunlight in space and transmits it wirelessly to Earth. Space solar power can solve our energy and greenhouse gas emissions problems. Not just help, not just take a step in the right direction, but solve. Space solar power can provide large quantities of energy to each and every person on Earth with very little environmental impact. The solar energy available in space is literally billions of times greater than we use today. The lifetime of the sun is an estimated 4-5 billion years, making space solar power a truly long-term energy solution. As Earth receives only one part in 2.3 billion of the Sun's output, space solar power is by far the largest potential energy source available, dwarfing all others combined. Solar energy is routinely used on nearly all spacecraft today. This technology on a larger scale, combined with already demonstrated wireless power transmission (see 2-minute video of demo), can supply nearly all the electrical needs of our planet. Another need is to move away from fossil fuels for our transportation system. While electricity powers few vehicles today, hybrids will soon evolve into plug-in hybrids which can use electric energy from the grid. As batteries, super-capacitors, and fuel cells improve, the gasoline engine will gradually play a smaller and smaller role in transportation — but only if we can generate the enormous quantities of electrical energy we need. It doesn't help to remove fossil fuels from vehicles if you just turn around and use fossil fuels again to generate the electricity to power those vehicles. Space solar power can provide the needed clean power for any future electric transportation system. While all viable energy options should be pursued with vigor, space solar power has a number of substantial advantages over other energy sources.

## Link – Solves Warming

### SSP leads to mass displacement of fossil fuels – solves warming

Mankins 8 – Former Manager of Concept Studies @ NASA

John Mankins, President of ARTEMIS Innovation Management Solutions LLC and Co-founder and Chief Operating Officer (COO) of Managed Energy Technologies LLC, MBA in Public Policy Analysis, authored or co-authored more than 70 published papers, reports and other technical documents, and has testified before Congress on several occasions, and has been consulted on R&D management and space issues with organizations in the U.S. and internationally, “Inexhaustible Energy from Orbit” Spring 2008, Ad Astra, http://www.nss.org/adastra/AdAstra-SBSP-2008.pdf

At an altitude of 22,240 miles above Earth, a great platform orbits, using vast, mirrored wings to collect a continuous torrent of sunlight always available in space. With few moving parts, the platform redirects and focuses this solar energy onto concentrating photovoltaic arrays—converting it into electrical power. In turn, the power is transmitted wirelessly—and with minimal losses—to highly-efficient receivers the size of airports on the ground. It is a seamless, endless transfer: The platform constantly gathers more than 5,000 megawatts of sunlight and delivers more than 2,000 megawatts of clean, near-zero carbon electrical power to customers as needed anywhere within an area the size of a continent. It can be routed directly into the electrical grid as base-load power—and divided across a half dozen or more receivers to meet local peak power needs. It can be used as well to power the annual production of **hundreds of millions of gallons** of carbon-neutral synthetic fuels. In an era when new energy options are urgently needed, space solar power is an **inexhaustible solution**—and the **technologies now exist** to make it a reality. The world cannot wait much longer. While the past century has been one of the most remarkable periods in human history, it has also been dominated by the use of fossil fuels. Yet, the accelerating global consumption of affordable and available energy sources will soon present fundamental challenges. In less time than has passed since the founding of Jamestown, today’s coal reserves will be forever gone. Also, most scientists agree that the use of fossil fuels is **profoundly altering both local environments and the climate** of the world itself. Capturing solar power from space-based platforms **can solve this crisis**. This is energy that is essentially carbon-free, endless and can be dispatched to best meet the dynamically changing requirements of populations separated by thousands of miles.

### SPS solves warming

Mankins 9 – Former Manager of Concept Studies @ NASA

John Mankins, President of ARTEMIS Innovation Management Solutions LLC and Co-founder and Chief Operating Officer (COO) of Managed Energy Technologies LLC, MBA in Public Policy Analysis, authored or co-authored more than 70 published papers, reports and other technical documents, and has testified before Congress on several occasions, and has been consulted on R&D management and space issues with organizations in the U.S. and internationally, 2009, “New directions for space solar power,” Acta Astronautica 65, Science Direct

The history of human civilization is a history of great infrastructure. Chief among these developments have been advances in power, transport, and communications. Without steady advances in these critical systems during the past two hundred years— especially in the available sources of power—the world would be a drastically poorer and harsher home for humanity. At the same time, through the global use of existing energy technologies humanity is rapidly consuming irreplaceable fossil resources as well as changing the **environment and the climate** of the world itself. Both factors must raise concerns about the **long-term sustainability** of the infrastructures that have enabled our world. In recent years, the economic analysis has shifted; global oil prices have increased signiﬁcantly and the demand for energy—particularly in major developing nations such as China and India—has risen sharply. Also, the challenges facing the environment have continued to increase. The possibility of green-house gas induced global warming was an unproven topic for ‘dinner party’ conversation in the 1960s. In the early 2000s, almost all reputable climate scientists accepted the very near certainty that humans are changing the Earth’s climate. And it has been almost 40 years since the invention of SPS, 30 years since the initiation of the major study that led to the 1979 Reference System, and a decade since the “Fresh Look Study”. It is time to examine SSP anew. The key reasons that new energy sources should be pursued are four-fold: the needs for the industrialized economies, the challenge of global development, climate change concerns, and the value of research and development (R&D) as “insurance” against the unknown.

## Link – Climate Agreement

### The plan leads to global energy cooperation – ensures sharing – leads to global agreement in 2013

Komerath 10 – Professor of Aerospace Engineering

Narayanan, 1-4-2010, “The Space Power Grid: Synergy Between Space, Energy and Security Policies,” http://smartech.gatech.edu/bitstream/handle/1853/32263/217-673-1-PB.pdf.txt?sequence=3

SPECIAL POLICY FEATURES OF THE SPACE POWER GRID 1. Global Collaboration Model Such a system involving global power exchange obviously requires global collaboration. It spans many of the issues in building Space infrastructure, and international collaboration for ground infrastructure and energy trading. ROI large enough to attract private capital is not realistic because of the large risk. Public financing is also needed to ensure serious intent on the part of governments to complete the project. The SPG involves placing a substantial number of satellites into low/mid earth orbit, and several large ultralight collectors into high orbits. There will be powerful beams of energy crisscrossing between these. Cooperative regulation could be modeled after the various UN agreements that allot orbit sectors and frequency bandwidth to nations to enable the communication satellites, the GPS, Galileo and Glonass global positioning systems. A global solar power grid in Space should meet with support from all the spacefaring nations, and from most non-spacefaring nations. Already, apart from the US and Europe, Japan, which has few fossil power resources, has a very strong program[24,25] for space solar power. China has been tapped by the European Union for participation in a power grid. Russia, China, Africa and Australia have vast undeveloped areas that are suitable for renewable power generation but lack terrestrial power grids, while the many island nations of the world would benefit from beamed power as a replacement for fossil power. India, with a growing space program, has already invested heavily in microwave infrastructure for communications, and should be amenable to converting some of that to power beaming purposes. With the next round of the Climate Control global agreement **due in 2013**, consensus appears to have emerged on the issues confronting nations, as well as the possibility of **concerted global action.** This generates a **climate ripe** for undertaking the **massive collaborative effort** that can lead to **true energy independence**.

## Link – Environment Affirmative

### Only SPS can create enough energy to sustain drastically increasing populations

-10 billion people

Garretson 10 - a Visiting Fellow at the Institute for Defense Studies @ IDSA

Peter, SKY’S NO LIMIT: “SPACE-BASED SOLAR POWER, THE NEXT MAJOR STEP IN THE INDO-US STRATEGIC PARTNERSHIP?,” August 2010, http://www.idsa.in/sites/default/files/OP\_SkysNoLimit.pdf,pg 17-18,HG

The significance of SBSP systems lies in its many potential advantages. These advantages address multiple contemporary proble constituencies. Like other renewable energy sources, SBSP systems provide a nondepletable source of carbon-neutral energy for long-term sustainable development. Unlike other renewable energy sources, it is in the nature of SBSP concepts to provide energy in a highly usable form with an exceptional capacity factor. The ability to provide 24-hour, predictable, dispatchable electric power in quantities appropriate for base-load cities (by 2039, as much as 50 to 60 per cent of India’s 1.6 billion population will reside in cities 8 ), and industrial processes means that it can fill the same roles as nuclear power, hydroelectric power, natural gas and coal. Therefore, the concept can address both immediate concerns regarding the need to displace carbon producing plants with cleaner power and longer term needs to replace the very substantial investment and dependence on coal and other fossil fuels as they are depleted. The importance of a base-load and urban capable renewable power source cannot be understated. The nature of the satellites and their receiver also means that much intermediate and costly transmission infrastructure can be dispensed with and a single satellite can service multiple receiving stations, augmenting peaking loads as necessary. A second key advantage of SBSP is its scalability. Experts calculate that the exploitable energy in orbit exceeds not just the electrical demand of the planet today, but the total energy needs of a fully developed planet **with over 10 billion people**. Because of the strong coupling between electrification, human development and gross national product (GNP) / gross world product (GWP), the addition of new, non-polluting highly-usable energy has a highly beneficial effect on poverty alleviation and creation of economic opportunity and wealth. The very large size of the market also means that a successful space solar power industry will create many jobs, much wealth and significant tax revenues for the state, and have a highly stimulatory effect on space and high tech industry and national tech base.

## Yes Warming – Real, Human Induced, Cuts Key

### Warming is real and human induced – drastic emissions reductions are key to avoid dangerous climate disruptions

-now is key

-AR4 = IPCC

Somerville 11 – Professor of Oceanography @ UCSD

Richard Somerville, Distinguished Professor Emeritus and Research Professor at Scripps Institution of Oceanography at the University of California, San Diego, Coordinating Lead Author in Working Group I for the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 3-8-2011, “CLIMATE SCIENCE AND EPA'S GREENHOUSE GAS REGULATIONS,” CQ Congressional Testimony, Lexis

1n early 2007, at the time of the publication of WG1 of AR4, the mainstream global community of climate scientists already understood from the most recent research that the latest observations of climate change were disquieting. In the words of a research paper published at the same time as the release of AR4 WG1, a paper for which I am a co-author, "observational data underscore the concerns about global climate change. Previous projections, as summarized by IPCC, have **not exaggerated** but may in some respects even have **underestimated the change**" (Rahmstorf et al. 2007). Now, in 2011, more recent research and newer observations have demonstrated that climate change continues to occur, and in several aspects the magnitude and rapidity of observed changes frequently **exceed the estimates of earlier projections**, including those of AR4. In addition, the case for attributing much observed recent climate change to human activities is **even stronger now** than at the time of AR4. Several recent examples, drawn from many aspects of climate science, but especially emphasizing atmospheric phenomena, support this conclusion. These include temperature, atmospheric moisture content, precipitation, and other aspects of the hydrological cycle. Motivated by the rapid progress in research, a recent scientific synthesis, The Copenhagen Diagnosis (Allison et al. 2009), has assessed recent climate research findings, including: -- Measurements show that the Greenland and Antarctic ice-sheets are losing mass and contributing to sea level rise. -- Arctic sea-ice has melted far beyond the expectations of climate models. -- Global sea level rise may attain or exceed 1 meter by 2100, with a rise of up to 2 meters considered possible. -- In 2008, global carbon dioxide emissions from fossil fuels were about 40% higher than those in 1990. -- At today's global emissions rates, if these rates were to be sustained unchanged, after only about 20 more years, the world will no **longer have a reasonable chance** of **limiting warming** to less than 2 degrees Celsius, or 3.6 degrees Fahrenheit, above 19th-century pre-industrial temperature levels, This is a much- discussed goal for a maximum allowable degree of climate change, and this aspirational target has now been formally adopted by the European Union and is supported by many other countries, as expressed, for example, in statements by both the G-8 and G-20 groups of nations. The Copenhagen Diagnosis also cites research supporting the position that, in order to have a reasonable likelihood of avoiding the risk of **dangerous climate disruption**, defined by this 2 degree Celsius (or 3.6 degree Fahrenheit) limit, global emissions of greenhouse gases such as carbon dioxide must peak and then start to **decline rapidly** within the next five to ten years, reaching near zero well within this century.

## Yes Warming – Human Induced

### Warming is real and human induced – consensus is on our side – numerous studies prove

Rahmstorf 8 – Professor of Physics of the Oceans

Richard, of Physics of the Oceans at Potsdam University, Global Warming: Looking Beyond Kyoto, Edited by Ernesto Zedillo, “Anthropogenic Climate Change?,” pg. 42-4

It is time to turn to statement B: human activities are altering the climate. This can be broken into two parts. The first is as follows: global climate is warming. This is by now a generally undisputed point (except by novelist Michael Crichton), so we deal with it only briefly. The two leading compilations of data measured with thermometers are shown in figure 3-3, that of the National Aeronautics and Space Administration (NASA) and that of the British Hadley Centre for Climate Change. Although they differ in the details, due to the inclusion of different data sets and use of different spatial averaging and quality control procedures, they both show a consistent picture, with a global mean warming of 0.8°C since the late nineteenth century. Temperatures over the past ten years clearly were the warmest since measured records have been available. The year 1998 sticks out well above the longterm trend due to the occurrence of a major El Nino event that year (the last El Nino so far and one of the strongest on record). These events are examples of the largest natural climate variations on multiyear time scales and, by releasing heat from the ocean, generally cause positive anomalies in global mean temperature. It is remarkable that the year 2005 rivaled the heat of 1998 even though no El Nino event occurred that year. (A bizarre curiosity, perhaps worth mentioning, is that several prominent "climate skeptics" recently used the extreme year 1998 to claim in the media that global warming had ended. In Lindzen's words, "Indeed, the absence of any record breakers during the past seven years is statistical evidence that temperatures are not increasing.")33 In addition to the surface measurements, the more recent portion of the global warming trend (since 1979) is also documented by satellite data. It is not straightforward to derive a reliable surface temperature trend from satellites, as they measure radiation coming from throughout the atmosphere (not just near the surface), including the stratosphere, which has strongly cooled, and the records are not homogeneous' due to the short life span of individual satellites, the problem of orbital decay, observations at different times of day, and drifts in instrument calibration.' Current analyses of these satellite data show trends that are fully consistent with surface measurements and model simulations." If no reliable temperature measurements existed, could we be sure that the climate is warming? The "canaries in the coal mine" of climate change (as glaciologist Lonnie Thompson puts it) ~are mountain glaciers. We know, both from old photographs and from the position of the terminal moraines heaped up by the flowing ice, that mountain glaciers have been in retreat all over the world during the past century. There are precious few exceptions, and they are associated with a strong increase in precipitation or local cooling.36 I have inspected examples of shrinking glaciers myself in field trips to Switzerland, Norway, and New Zealand. As glaciers respond sensitively to temperature changes, data on the extent of glaciers have been used to reconstruct a history of Northern Hemisphere temperature over the past four centuries (see figure 3-4). Cores drilled in tropical glaciers show signs of recent melting that is unprecedented at least throughout the Holocene-the past 10,000 years. Another powerful sign of warming, visible clearly from satellites, is the shrinking Arctic sea ice cover (figure 3-5), which has declined 20 percent since satellite observations began in 1979. While climate clearly became warmer in the twentieth century, much discussion particularly in the popular media has focused on the question of how "unusual" this warming is in a longer-term context. While this is an interesting question, it has often been mixed incorrectly with the question of causation. Scientifically, how unusual recent warming is-say, compared to the past millennium-in itself contains little information about its cause. Even a highly unusual warming could have a natural cause (for example, an exceptional increase in solar activity). And even a warming within the bounds of past natural variations could have a predominantly anthropogenic cause. I come to the question of causation shortly, after briefly visiting the evidence for past natural climate variations. Records from the time before systematic temperature measurements were collected are based on "proxy data," coming from tree rings, ice cores, corals, and other sources. These proxy data are generally linked to local temperatures in some way, but they may be influenced by other parameters as well (for example, precipitation), they may have a seasonal bias (for example, the growth season for tree rings), and high-quality long records are difficult to obtain and therefore few in number and geographic coverage. Therefore, there is still substantial uncertainty in the evolution of past global or hemispheric temperatures. (Comparing only local or regional temperature; as in Europe, is of limited value for our purposes,' as regional variations can be much larger than global ones and can have many regional causes, unrelated to global-scale forcing and climate change.) The first quantitative reconstruction for the Northern Hemisphere temperature of the past millennium, including an error estimation, was presented by Mann, Bradley, and Hughes and rightly highlighted in the 2001 IPCC report as one of the major new findings since its 1995 report; it is shown in figure 3\_6.39 The analysis suggests that, despite the large error bars, twentieth-century warming is indeed highly unusual and probably was unprecedented during the past millennium. This result, presumably because of its symbolic power, has attracted much criticism, to some extent in scientific journals, but even more so in the popular media. The hockey stick-shaped curve became a symbol for the IPCC, .and criticizing this particular data analysis became an avenue for some to question the credibility of the IPCC. Three important things have been overlooked in much of the media coverage. First, even if the scientific critics had been right, this would not have called into question the very cautious conclusion drawn by the IPCC from the reconstruction by Mann, Bradley, and Hughes: "New analyses of proxy data for the Northern Hemisphere indicate that the increase in temperature in the twentieth century is likely to have been the largest of any century during the past 1,000 years." This conclusion has since been supported further by every single one of close to a dozen new reconstructions (two of which are shown in figure 3-6).Second, by far the most serious scientific criticism raised against Mann, Hughes, and Bradley was simply based on a mistake. 40 The prominent paper of von Storch and others, which claimed (based on a model test) that the method of Mann, Bradley, and Hughes systematically underestimated variability, "was [itself] based on incorrect implementation of the reconstruction procedure."41 With correct implementation, climate field reconstruction procedures such as the one used by Mann, Bradley, and Hughes have been shown to perform well in similar model tests. Third, whether their reconstruction is accurate or not has no bearing on policy. If their analysis underestimated past natural climate variability, this would certainly not argue for a smaller climate sensitivity and thus a lesser concern about the consequences of our emissions. Some have argued that, in contrast, it would point to a larger climate sensitivity. While this is a valid point in principle, it does not apply in practice to the climate sensitivity estimates discussed herein or to the range given by IPCC, since these did not use the reconstruction of Mann, Hughes, and Bradley or any other proxy records of the past millennium. Media claims that "a pillar of the Kyoto Protocol" had been called into question were therefore misinformed. As an aside, the protocol was agreed in 1997, before the reconstruction in question even existed. The overheated public debate on this topic has, at least, helped to attract more researchers and funding to this area of paleoclimatology; its methodology has advanced significantly, and a number of new reconstructions have been presented in recent years. While the science has moved forward, the first seminal reconstruction by Mann, Hughes, and Bradley has held up remarkably well, with its main features reproduced by more recent work. Further progress probably will require substantial amounts of new proxy data, rather than further refinement of the statistical techniques pioneered by Mann, Hughes, and Bradley. Developing these data sets will require time and substantial effort. It is time to address the final statement: most of the observed warming over the past fifty years is anthropogenic. A large number of studies exist that have taken different approaches to analyze this issue, which is generally called the "attribution problem." I do not discuss the exact share of the anthropogenic contribution (although this is an interesting question). By "most" I imply mean "more than 50 percent.”The first and crucial piece of evidence is, of course, that the magnitude of the warming is what is expected from the anthropogenic perturbation of the radiation balance, so anthropogenic forcing is able to explain all of the temperature rise. As discussed here, the rise in greenhouse gases alone corresponds to 2.6 W/tn2 of forcing. This by itself, after subtraction of the observed 0'.6 W/m2 of ocean heat uptake, would Cause 1.6°C of warming since preindustrial times for medium climate sensitivity (3"C). With a current "best guess'; aerosol forcing of 1 W/m2, the expected warming is O.8°c. The point here is not that it is possible to obtain the 'exact observed number-this is fortuitous because the amount of aerosol' forcing is still very' uncertain-but that the expected magnitude is roughly right. There can be little doubt that the anthropogenic forcing is large enough to explain most of the warming. Depending on aerosol forcing and climate sensitivity, it could explain a large fraction of the warming, or all of it, or even more warming than has been observed (leaving room for natural processes to counteract some of the warming). The second important piece of evidence is clear: there is no viable alternative explanation. In the scientific literature, no serious alternative hypothesis has been proposed to explain the observed global warming. Other possible causes, such as solar activity, volcanic activity, cosmic rays, or orbital cycles, are well observed, but they do not show trends capable of explaining the observed warming. Since 1978, solar irradiance has been measured directly from satellites and shows the well-known eleven-year solar cycle, but no trend. There are various estimates of solar variability before this time, based on sunspot numbers, solar cycle length, the geomagnetic AA index, neutron monitor data, and, carbon-14 data. These indicate that solar activity probably increased somewhat up to 1940. While there is disagreement about the variation in previous centuries, different authors agree that solar activity did not significantly increase during the last sixty-five years. Therefore, this cannot explain the warming, and neither can any of the other factors mentioned. Models driven by natural factors only, leaving the anthropogenic forcing aside, show a cooling in the second half of the twentieth century (for an example, See figure 2-2, panel a, in chapter 2 of this volume). The trend in the sum of natural forcings is downward.The only way out would be either some as yet undiscovered unknown forcing or a warming trend that arises by chance from an unforced internal variability in the climate system. The latter cannot be completely ruled out, but has to be considered highly unlikely. No evidence in the observed record, proxy data, or current models suggest that such internal variability could cause a sustained trend of global warming of the observed magnitude. As discussed, twentieth century warming is unprecedented over the past 1,000 years (or even 2,000 years, as the few longer reconstructions available now suggest), which does not 'support the idea of large internal fluctuations. Also, those past variations correlate well with past forcing (solar variability, volcanic activity) and thus appear to be largely forced rather than due to unforced internal variability." And indeed, it would be difficult for a large and sustained unforced variability to satisfy the fundamental physical law of energy conservation. Natural internal variability generally shifts heat around different parts of the climate system-for example, the large El Nino event of 1998, which warmed, the atmosphere by releasing heat stored in the ocean. This mechanism implies that the ocean heat content drops as the atmosphere warms. For past decades, as discussed, we observed the atmosphere warming and the ocean heat content increasing, which rules out heat release from the ocean as a cause of surface warming. The heat content of the whole climate system is increasing, and there is no plausible source of this heat other than the heat trapped by greenhouse gases. ' A completely different approach to attribution is to analyze the spatial patterns of climate change. This is done in so-called fingerprint studies, which associate particular patterns or "fingerprints" with different forcings. It is plausible that the pattern of a solar-forced climate change differs from the pattern of a change caused by greenhouse gases. For example, a characteristic of greenhouse gases is that heat is trapped closer to the Earth's surface and that, unlike solar variability, greenhouse gases tend to warm more in winter, and at night. Such studies have used different data sets and have been performed by different groups of researchers with different statistical methods. They consistently conclude that the observed spatial pattern of warming can only be explained by greenhouse gases.49 Overall, it has to be considered, highly likely' that the observed warming is indeed predominantly due to the human-caused increase in greenhouse gases. ' This paper discussed the evidence for the anthropogenic increase in atmospheric CO2 concentration and the effect of CO2 on climate, finding that this anthropogenic increase is proven beyond reasonable doubt and that a mass of evidence points to a CO2 effect on climate of 3C ± 1.59C global-warming for a doubling of concentration. (This is, the classic IPCC range; my personal assessment is that, in-the light of new studies since the IPCC Third Assessment Report, the uncertainty range can now be narrowed somewhat to 3°C ± 1.0C) This is based on consistent results from theory, models, and data analysis, and, even in the absence-of any computer models, the same result would still hold based on physics and on data from climate history alone. Considering the plethora of consistent evidence, the chance that these conclusions are wrong has to be considered minute. If the preceding is accepted, then it follows logically and incontrovertibly that a further increase in CO2 concentration will lead to further warming. The magnitude of our emissions depends on human behavior, but the climatic response to various emissions scenarios can be computed from the information presented here. The result is the famous range of future global temperature scenarios shown in figure 3\_6.50 Two additional steps are involved in these computations: the consideration of anthropogenic forcings other than CO2 (for example, other greenhouse gases and aerosols) and the computation of concentrations from the emissions. Other gases are not discussed here, although they are important to get quantitatively accurate results. CO2 is the largest and most important forcing. Concerning concentrations, the scenarios shown basically assume that ocean and biosphere take up a similar share of our emitted CO2 as in the past. This could turn out to be an optimistic assumption; some models indicate the possibility of a positive feedback, with the biosphere turning into a carbon source rather than a sink under growing climatic stress. It is clear that even in the more optimistic of the shown (non-mitigation) scenarios, global temperature would rise by 2-3°C above its preindustrial level by the end of this century. Even for a paleoclimatologist like myself, this is an extraordinarily high temperature, which is very likely unprecedented in at least the past 100,000 years. As far as the data show, we would have to go back about 3 million years, to the Pliocene, for comparable temperatures. The rate of this warming (which is important for the ability of ecosystems to cope) is also highly unusual and unprecedented probably for an even longer time. The last major global warming trend occurred when the last great Ice Age ended between 15,000 and 10,000 years ago: this was a warming of about 5°C over 5,000 years, that is, a rate of only 0.1 °C per century. 52 The expected magnitude and rate of planetary warming is highly likely to come with major risk and impacts in terms of sea level rise (Pliocene sea level was 25-35 meters higher than now due to smaller Greenland and Antarctic ice sheets), extreme events (for example, hurricane activity is expected to increase in a warmer climate), and ecosystem loss. The second part of this paper examined the evidence for the current warming of the planet and discussed what is known about its causes. This part showed that global warming is already a measured and-well-established fact, not a theory. Many different lines of evidence consistently show that most of the observed warming of the past fifty years was caused by human activity. Above all, this warming is exactly what would be expected given the anthropogenic rise in greenhouse gases, and no viable alternative explanation for this warming has been proposed in the scientific literature. Taken together., the very strong evidence accumulated from thousands of independent studies, has over the past decades convinced virtually every climatologist around the world (many of whom were initially quite skeptical, including myself) that anthropogenic global warming is a reality with which we need to deal.

### There is no other viable explanation

Rahmstorf 8 – Professor of Physics of the Oceans

Richard, of Physics of the Oceans at Potsdam University, Global Warming: Looking Beyond Kyoto. Edited by Ernesto Zedillo. “Anthropogenic Climate Change?” pg. 47

The first and crucial piece of evidence is, of course, that the magnitude of the warming is what is expected from the anthropogenic perturbation of the radiation balance, so anthropogenic forcing is able to explain all of the temperature rise. As discussed here, the rise in greenhouse gases alone corresponds to 2.6 W/m of forcing. This by itself, after subtraction of the observed 0.6 W/nr of ocean heat uptake, would cause 1.6°C of warming since preinduslrial times for medium climate sensitivity (3°C). With a current "best guess" aerosol forcing of 1 W/m\ the expected warming is 0.8°C. The point here is not that it is possible to obtain the exact observed number—this is fortuitous because the amount of aerosol forcing is still very uncertain—but that the expected magnitude is roughly right. There can be **little doubt** that the anthropogenic forcing is large enough to explain most of the warming. Depending on aerosol forcing and climate sensitivity, it could explain a large fraction of the warming, or all of it, or even more warming than has been observed (leaving room for natural processes to counteract some of the warming). The second important piece of evidence is clear: **there is no viable alternative explanation**. In the scientific literature, **no serious alternative hypothesis** has been proposed to explain the observed global warming. Other possible causes, such as solar activity, volcanic activity, cosmic rays, or orbital cycles, arc well observed, but they do not show trends capable of explaining the observed warming. Since 1978, solar irradiance has been measured directly from satellites and shows the well-known eleven-year solar cycle, but no trend.44 There arc various estimates of solar variability before this time, based on sunspot numbers, solar cycle length, the geomagnetic AA index, neutron monitor data, and carbon- 1 A data. These indicate that solar activity probably increased somewhat up to 1940. While there is disagreement about the variation in previous centuries, different authors agree that solar activity did not significantly increase during the last sixty-five years.''11 Therefore, this cannot explain the warming, and neither can any of the other factors mentioned. Models driven by natural factors only, leaving the anthropogenic forcing aside, show a cooling in the second half of the twentieth century (for an example, see figure 2-2, panel a, in chapter 2 of this volume). The trend in the sum of natural forcings is downward.

### Warming is real and anthropogenic – NOAA consensus – final panel before the IPCC

Blunden, Arndt, and Baringer et al 10 - \* NOAA/NESDIS National Climatic Data Center, Asheville, North Carolina, \*\* NOAA/NESDIS National Climatic Data Center, Asheville, North Carolina, \*\*\* NOAA/OAR Atlantic Oceanographic and Meteorological Laboratory, Miami, Florida (State of the Climate in 2010, <http://www1.ncdc.noaa.gov/pub/data/cmb/bams-sotc/climate-assessment-2010-lo-rez.pdf>)

**Several large-scale climate patterns influenced climate conditions and weather patterns across the globe during 2010**. The transition from a warm El Niño phase at the beginning of the year to a cool La Niña phase by July contributed to many notable events, ranging from record wetness across much of Australia to historically low Eastern Pacific basin and near-record high North Atlantic basin hurricane activity. The remaining five main hurricane basins experienced below- to well-below-normal tropical cyclone activity. The negative phase of the Arctic Oscillation was a major driver of Northern Hemisphere temperature patterns during 2009/10 winter and again in late 2010. It contributed to record snowfall and unusually low temperatures over much of northern Eurasia and parts of the United States, while bringing above-normal temperatures to the high northern latitudes. The February Arctic Oscillation Index value was the most negative since records began in 1950. **The 2010 average global land and ocean surface temperature was among the two warmest years on record.** The Arctic continued to warm at about twice the rate of lower latitudes. The eastern and tropical Pacific Ocean cooled about 1°C from 2009 to 2010, reflecting the transition from the 2009/10 El Niño to the 2010/11 La Niña. Ocean heat fluxes contributed to warm sea surface temperature anomalies in the North Atlantic and the tropical Indian and western Pacific Oceans. Global integrals of upper ocean heat content for the past several years have reached values consistently higher than for all prior times in the record, demonstrating the dominant role of the ocean in the Earth’s energy budget. Deep and abyssal waters of Antarctic origin have also trended warmer on average since the early 1990s. Lower tropospheric temperatures typically lag ENSO surface fluctuations by two to four months, thus **the 2010 temperature was dominated by the warm phase El Niño conditions that occurred during the latter half of 2009 and early 2010 and was second warmest on record**. The stratosphere continued to be anomalously cool. Annual global precipitation over land areas was about five percent above normal. Precipitation over the ocean was drier than normal after a wet year in 2009. Overall, saltier (higher evaporation) regions of the ocean surface continue to be anomalously salty, and fresher (higher precipitation) regions continue to be anomalously fresh. This salinity pattern, which has held since at least 2004, suggests an increase in the hydrological cycle. Sea ice conditions in the Arctic were significantly different than those in the Antarctic during the year. The annual minimum ice extent in the Arctic—reached in September—was the third lowest on record since 1979. In the Antarctic, zonally averaged sea ice extent reached an all-time record maximum from mid-June through late August and again from mid-November through early December. Corresponding record positive Southern Hemisphere Annular Mode Indices influenced the Antarctic sea ice extents. Greenland glaciers lost more mass than any other year in the decade-long record. The Greenland Ice Sheet lost a record amount of mass, as the melt rate was the highest since at least 1958, and the area and duration of the melting was greater than any year since at least 1978. High summer air temperatures and a longer melt season also caused a continued increase in the rate of ice mass loss from small glaciers and ice caps in the Canadian Arctic. Coastal sites in Alaska show continuous permafrost warming and sites in Alaska, Canada, and Russia indicate more significant warming in relatively cold permafrost than in warm permafrost in the same geographical area. With regional differences, permafrost temperatures are now up to 2°C warmer than they were 20 to 30 years ago. Preliminary data indicate there is a high probability that 2010 will be the 20th consecutive year that alpine glaciers have lost mass. Atmospheric greenhouse gas concentrations continued to rise and ozone depleting substances continued to decrease. Carbon dioxide increased by 2.60 ppm in 2010, a rate above both the 2009 and the 1980–2010 average rates**. The global ocean carbon dioxide uptake for the 2009 transition period from La Niña to El Niño conditions, the most recent period for which analyzed data are available, is estimated to be similar to the long-term average**. The 2010 Antarctic ozone hole was among the lowest 20% compared with other years since 1990, a result of warmer-than-average temperatures in the Antarctic stratosphere during austral winter between mid-July and early September.

## Yes Warming – Prefer Our Evidence

### Climate consensus is real – climate skeptics hyperbolize difference

Somerville 11 – Professor of Oceanography @ UCSD

Richard Somerville, Distinguished Professor Emeritus and Research Professor at Scripps Institution of Oceanography at the University of California, San Diego, Coordinating Lead Author in Working Group I for the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 3-8-2011, “CLIMATE SCIENCE AND EPA'S GREENHOUSE GAS REGULATIONS,” CQ Congressional Testimony, Lexis

It is a standard tactic of many climate "skeptics" or "contrarians" (terms commonly used to denote those who reject central findings of mainstream climate change science) to try to frame this issue in terms of the whole edifice of modern climate science hanging from some slender thread. Thus, if a given scientist uses intemperate language, or a particular measurement is missing from an archive, or a published paper has a minor mistake in it, the **whole unstable scientific structure comes tumbling down**, or so the skeptics would have people believe. In fact, climate change science is **not at all fragile or vulnerable**, and there are multiple lines of evidence in support of every one of its main conclusions. That is what the 2007 IPCC AR4 report says. It remains definitive. Historians of science tell us that the overwhelming degree of scientific agreement on climate change is rare for such a complex issue. A Galileo does come along every few hundred years to reveal fundamental errors in the prevailing understanding and thus to revolutionize a branch of science. However, almost all the people who think they are a Galileo are simply wrong. Facts matter.

## Yes Warming – Prefer Our Evidence – Standards

### \*\*\*This card also defends public education about global warming

### There should be an extremely high standard of evidence in debates about global warming – current climate skepticism ignores peer-review, comes from unspecialized writers, cherry picks evidence and is informed by ideology

Somerville 11 – Professor of Oceanography @ UCSD

Richard Somerville, Distinguished Professor Emeritus and Research Professor at Scripps Institution of Oceanography at the University of California, San Diego, Coordinating Lead Author in Working Group I for the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 3-8-2011, “CLIMATE SCIENCE AND EPA'S GREENHOUSE GAS REGULATIONS,” CQ Congressional Testimony, Lexis

Although the expert community is in wide agreement on the basic results of climate change science, as assessed in AR4 and The Copenhagen Diagnosis, much confusion exists among the general public and politicians in many countries, as polling data convincingly shows. In my opinion, many **people need to learn more about the nature of junk or fake science**, so they will be better equipped to recognize and reject it. There are a number of warning signs that can help identify suspicious claims. One is failure to rely on and cite published research results from peer- reviewed journals. Trustworthy science is not something that appears first on television or the Internet. Reputable scientists first announce the results of their research by peer-reviewed publication in well-regarded scientific journals. Peer review is not a guarantee of excellent science, but the lack of it is a red flag. **Peer review is a necessary** rather than a sufficient **criterion**. Another warning sign is a lack of relevant credentials on the part of the person making assertions, especially education and research experience in the specialized field in question. For example, it is not essential to have earned a Ph. D. degree or to hold a university professorship. It is important, however, that the person be qualified, not in some general broad scientific area, such as physics or chemistry, but in the relevant specialty. Accomplishments and even great distinction in one area of science do not qualify anybody to speak authoritatively in a very different area. We would not ask even an expert cardiologist for advice on, say, dentistry. One should inquire whether the person claiming expertise in some area of climate science has done first-person research on the topic under consideration and published it in reputable peer-reviewed journals. Is the person actively participating in the research area in question, or simply criticizing it from the vantage point of an outsider? One should be suspicious of a lack of detailed familiarity with the specific scientific topic and its research literature. Good science takes account of what is already known and acknowledges and builds on earlier research by others. Other warning signs include a blatant failure to be objective and to consider all relevant research results, both pro and con a given position. Scientific honesty and integrity require wide- ranging and thorough consideration of all the evidence that might bear on a particular question. Choosing to make selective choices among competing evidence, so as to emphasize those results that support a given position, while ignoring or dismissing any findings that do not support it, is a practice known as "cherry picking" and is a hallmark of poor science or pseudo-science. Mixing science with ideology or policy or personalities is never justified in research. Scientific validity has nothing to do with political viewpoints. There are no Republican or Democratic thermometers. Whether a given politician agrees or disagrees with a research finding is absolutely unimportant scientifically. Science can usefully inform the making of policy, but only if policy considerations have not infected the science. Similarly, one should always be alert to the risk of bias due to political viewpoints, ideological preferences, or connections with interested parties. All sources of funding, financial interests and other potential reasons for bias should be openly disclosed. Finally, we must always be alert for any hint of delusions of grandeur on the part of those who would insist that they themselves are correct, while nearly everyone else in the entire field of climate science is badly mistaken. Scientific progress is **nearly always incremental,** with very few exceptions. Occasionally, an unknown lone genius in a humble position, such as the young Einstein doing theoretical physics while working as a clerk in a patent office, does indeed revolutionize a scientific field, dramatically overthrowing conventional wisdom. However, such events are exceedingly rare, and claims to be such a lone genius deserve the most severe scrutiny. For every authentic Einstein, there must be thousands of outright charlatans, as well as many more ordinary mortals who are simply very badly mistaken.

## Yes Warming – Prefer Our Evidence

### Defense of peer-review, IPCC and James Hansen – criticism of climate denialism – funded by fossil fuel industry

Davies 8 – Professor of Geophysics @ ANU

Geoff Davies, PhD, Geophysicist at the Australian National University, 6-11-2008, “Why listen to scientists?.” Science Alert, http://www.sciencealert.com.au/opinions/20081106-17474.html

Professor Don Aitkin’s recent promotion (PDF 258KB) of the “sceptical” view of global warming and the ensuing heated debates on several web sites bring to the fore the question of what authority attaches to the published conclusions and judgments of climate scientists. Professor Aitkin, who is not a scientist, is in no doubt himself that the more outspoken climate scientists have a “quasi-religious” attitude. That is the mild end of the spectrum of opinions of sceptics/denialists/contrarians. Most of the media and many politicians seem to have the view that scientists are just another interest group, and that scientists’ opinions are just opinions, to be heard or discarded like any others. The Australian government seems to credit only the very conservative end of climate scientists’ warnings, because it is acting as though we have many decades in which to adjust, and many years before anything serious needs to be under way. The big difference between scientists’ professional conclusions and those of others is that science has a pervasive and well-developed quality-control process. The first stage is called peer review. Any paper that is published in a reputable scientific journal must be given the OK by several other scientists in the same field. Furthermore, after publication a paper will be read critically by many more scientists, and it is not uncommon for conclusions to be challenged in subsequent publications. For a paper to become widely acknowledged it must survive such scrutiny for a reasonable period, typically several years. All of this is on top of the fact that a scientific paper is based on observations of the world and on a large accumulation of well-tested regularities, such as the “laws” of physics. Few other groups have any comparable process. Certainly the media, politicians and climate sceptics have no such process.Most of the studies referred to by sceptics have either not been published in a relevant peer-reviewed scientific journal or have subsequently been challenged and found wanting in other peer-reviewed studies. The peer-review process is far from perfect, but it yields a product distinctly less unreliable than all the other opinions flying around. The process of the Intergovernmental Panel on Climate Change (IPCC) adds another layer of caution. Basically the IPCC gets a large number of relevant scientists to step back from the front-line disputes and ask “What can most of us agree on?”. Sceptics who dismiss all of the science because there are many disputes miss or obfuscate this basic aspect of IPCC assessments. There is a degree of judgment involved in the IPCC process, and in virtually any public summary by a climate scientist. Some would claim judgment is not the job of scientists; it is the job of politicians and others. But scientists are the best placed to judge the state of knowledge in their field. If their conclusions are potentially of great import, then they have a responsibility to state their best professional judgment. The claim by Professor Aitkin and many other sceptics that climate scientists don’t discuss the uncertainties in their conclusions and judgments simply misrepresents or misperceives the abundant information on uncertainties. Even the IPCC’s most terse summary statements clearly acknowledge uncertainty when they say, for example, “Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations” [emphasis in original]. The term “very likely” is specifically defined in the IPCC summaries to mean the “assessed likelihood, using expert judgment”, is greater than 90 per cent. Clive Hamilton contrasts the scientific and IPCC processes with those of many sceptics (see Atkin’s response here). He traces connections from relatively naïve people like Professor Aitkin back to people and web sites funded by ExxonMobil and others. Sceptics love to question the motives of climate scientists, but rarely mention the motives of the very powerful multi-trillion-dollar fossil fuel industry, parts of which are actively promoting doubt and disinformation in exactly the manner used by the tobacco industry for many years. Observations from the past two or three years, too recent to have been included in the 2007 IPCC Reports, show disturbing signs that the Earth’s response to our activities is happening much faster than expected. The most dramatic sign is a sudden acceleration of the rate of shrinkage of Arctic sea ice. Prominent NASA climate scientist Dr James Hansen is perhaps the most vocal, but far from alone, in arguing that the Earth may be very close to a tipping point beyond which large, unstoppable and irreversible climate change could occur. Scientific issues are not settled by appeals to authority, nor by a vote. That is not the issue here. The issue is whether scientists’ professional judgments have weight. Those in strategic positions in our society, like politicians and journalists, who treat scientists’ collective professional judgments as no better than any other opinion are being seriously irresponsible. You can ignore the IPCC if you want, but you should realise that its most recent assessment may have seriously understated the global warming problem. You can ignore James Hansen if you want, but you should know that his judgments from two or three decades ago are being broadly vindicated.

## Yes Warming – AT: CO2 is Natural

### Co2 is attributable to human-causes

McCarty 10 – Professor of Biological Oceanography @ Harvard

James, Professor of Biological Oceanography, at Harvard University, 5-6-2010, “Committee on House Select Energy Independence and Global Warming,” CQ Congressional Testimony, Lexis

Barnett et al. (2005) demonstrated that the observed changes in ocean heat-content since the 1960s are consistent with what would be expected from the accumulation of greenhouse gases from human activities, and that these patterns in warming cannot be solely explained by natural cycles, solar cycles or volcanic activity. **Vast numbers of studies** have corroborated these analyses, and there is no credible challenge to their validity. Multiple paths of research provide consistent and irrefutable evidence that the C02 increase in the atmosphere since the early 1800s is arising from human activities. Initially land use caused much of the change - forest clearing and soil tilling practices facilitate the conversion of living and dead organic material to C0z, and its release to the atmosphere. With a growing population and its needs for energy for heating, manufacturing, and lighting and increasing dependence on the internal combustion engine, fossil fuel combustion became the dominant, human-caused source of C02 release to the atmosphere. Stable and radioactive isotopes of carbon provide unambiguous evidence that the C02 accumulating in the atmosphere is **due to human activities**.

## Yes Warming – AT: Science is Indeterminate

### Even if science isn’t entirely conclusive, it must be included in debates about warming

Somerville 8 – Professor of Oceanography @ UCSD

Richard Somerville, Distinguished Professor Emeritus and Research Professor at Scripps Institution of Oceanography at the University of California, San Diego, Coordinating Lead Author in Working Group I for the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change, The Forgiving Air, pg. 159

In the case of climate change, just as with ozone depletion, our past actions may well have already committed the Earth to future change. If the theories of how climate will respond to an increased greenhouse effect are even approximately valid, then we've already committed our planet to substantial climate change. And, because scientific understanding is still seriously incomplete, we'll inevitably be making decisions that may have far-reaching consequences without having at hand all the scientific knowledge that we'd like. We've found compelling reasons to believe that the world should accelerate a transition to nonfossil primary energy sources. Should the countries of the world follow the model of France, which generates about three-fourths of its electricity from nuclear power? There arc serious disadvantages to nuclear power, as we've seen. Should humankind instead put increased efforts into developing renewable energy resources, like solar, wind, hydroelectric, geothermal, and biomass, all the sources of energy other than nuclear and fossil fuels? Should governments emphasize energy conservation and efficiency, which have many side benefits? I think so, though others disagree. After all, if you change your choice of cars and drive one that uses less fuel, or if you drive less, you not only help slow' the increase in the greenhouse effect by putting out less carbon dioxide from the tailpipe, you may also help reduce smog and save yourself some money—and perhaps even improve political stability in the Middle East. So there arc many ramifications to these choices. But the scientific element in these discussions **is critical**. You can't make a sensible decision about how to have an environmentally sustainable planet in the future if you don't have an understanding of the consequences of actions today—actions such as releasing CFCs into the atmosphere or burning fossil fuels and making carbon dioxide. **The role of science here is central**.

## Yes Warming – AT: “We Have Peer Reviewed Evidence”

### Peer review is not a sufficient condition to disprove climate science – balanced assessments like ACIA and IPCC overcome single skeptics

-most work is submitted outside of relevant fields

-they are a minority

-they are unqualified

-reviewers or editors have agendas that invalidate the paper’s conclusions

-they leak through because of mass publication

Mann and Schmidt 5 – Both professors @ Major Research institutions

Michael, Professor of Climatology @ Penn State University, Gavin, Professor of Research Science @ Columbia, 1-2005, “Peer Review: A Necessary But Not Sufficient Condition,” http://www.realclimate.org/index.php/archives/2005/01/peer-review-a-necessary-but-not-sufficient-condition/

On this site we emphasize conclusions that are supported by “peer-reviewed” climate research. That is, research that has been published by one or more scientists in a scholarly scientific journal after review by one or more experts in the scientists’ same field (‘peers’) for accuracy and validity. What is so important about “Peer Review”? As Chris Mooney has lucidly put it: [Peer Review] is an undisputed cornerstone of modern science. Central to the competitive clash of ideas that moves knowledge forward, peer review enjoys so much renown in the scientific community that studies lacking its imprimatur meet with automatic skepticism. Academic reputations hinge on an ability to get work through peer review and into leading journals; university presses employ peer review to decide which books they’re willing to publish; and federal agencies like the National Institutes of Health use peer review to weigh the merits of applications for federal research grants. Put simply, peer review is supposed to weed out poor science. However, **it is not foolproof** — a deeply flawed paper can end up being published under a number of different potential circumstances: (i) the work is submitted to a journal outside the relevant field (e.g. a paper on paleoclimate submitted to a social science journal) where the reviewers are likely to be chosen from a pool of individuals lacking the expertise to properly review the paper, (ii) too few or too unqualified a set of reviewers are chosen by the editor, (iii) the reviewers or editor (or both) have agendas, and overlook flaws that invalidate the paper’s conclusions, and (iv) the journal may process and publish so many papers that individual manuscripts occasionally do not get the editorial attention they deserve. Thus, while un-peer-reviewed claims should not be given much credence, just because a particular paper has passed through peer review does not absolutely insure that the conclusions are correct or scientifically valid. The “leaks” in the system outlined above unfortunately allow some less-than-ideal work to be published in peer-reviewed journals. This should therefore be a concern when the results of any one particular study are promoted over the conclusions of a larger body of past published work (especially if it is a new study that has not been fully absorbed or assessed by the community). Indeed, this is why scientific assessments such as the Arctic Climate Impact Assessment (ACIA), or the Intergovernmental Panel on Climate Change (IPCC) reports, and the independent reports by the National Academy of Sciences, **are so important** in giving a balanced overview of the state of knowledge in the scientific research community.

### A single peer-reviewed study doesn’t disprove overall consensus

Mann and Schmidt 5 – Both professors @ Major Research institutions

Michael, Professor of Climatology @ Penn State University, Gavin, Professor of Research Science @ Columbia, 1-2005, “Peer Review: A Necessary But Not Sufficient Condition,” http://www.realclimate.org/index.php/archives/2005/01/peer-review-a-necessary-but-not-sufficient-condition/

The current thinking of scientists on climate change is based on thousands of studies (Google Scholar gives 19,000 scientific articles for the full search phrase “global climate change”). Any new study will be **one small grain of evidence** that adds to this big pile, and it will shift the thinking of scientists slightly. Science proceeds like this in a slow, incremental way. It is extremely unlikely that any new study will immediately overthrow all the past knowledge. So even if the conclusions of the Shaviv and Veizer (2003) study discussed earlier, for instance, had been correct, this would be one small piece of evidence pitted against hundreds of others which contradict it. Scientists would find the apparent contradiction interesting and worthy of further investigation, and would devote further study to isolating the source of the contradiction. They would not suddenly throw out all previous results. Yet, one often gets the impression that scientific progress consists of a series of revolutions where scientists discard all their past thinking each time a new result gets published. This is often because only a small handful of high-profile studies in a given field are known by the wider public and media, and thus unrealistic weight is attached to those studies. New results are often over-emphasised (sometimes by the authors, sometimes by lobby groups) to make them sound important enough to have news value. Thus “bombshells” usually end up being duds.

## Yes Warming – AT: Urban Heat Island Effect

### Not relevant to warming trends

-tainted stations actually show less warming than good stations, but it’s statistically negligible

Muller 11 – Professor of Physics @ Berkeley

Richard Muller, Professor of Physics @ Berkeley, 3-31-2011, “Climate Change Policy Issues,” CQ Congressional Testimony, Lexis

Let me now address the problem of Poor Temperature Station Quality Many temperature stations in the U.S. are located near buildings, in parking lots, or close to heat sources. Anthony Watts and his team has shown that most of the current stations in the US Historical Climatology Network would be ranked "poor" by NOAA's own standards, with error uncertainties up to 5 degrees C. Did such poor station quality exaggerate the estimates of global warming? We've studied this issue, and our preliminary answer is no. The Berkeley Earth analysis shows that over the past 50 years the poor stations in the U.S. network do not show greater warming than do the good stations. Thus, although poor station quality might affect absolute temperature, it does not appear to affect trends, and for global warming estimates, **the trend is what is important**. Our key caveat is that our results are preliminary and have not yet been published in a peer reviewed journal. We have begun that process of submitting a paper to the Bulletin of the American Meteorological Society, and we are preparing several additional papers for publication elsewhere. NOAA has already published a similar conclusion - that station quality bias did not affect estimates of global warming based on a smaller set of stations, and Anthony Anthony Watts and his team have a paper submitted, which is in late stage peer review, using over 1000 stations, but it has not yet been accepted for publication and I am not at liberty to discuss their conclusions and how they might differ. We have looked only at average temperature changes, and additional data needs to be studied, to look at (for example) changes in maximum and minimum temperatures. In fact, in our preliminary analysis the good stations **report more warming** in the U.S. than the poor stations by 0.009 0.009 degrees per decade, opposite to what might be expected, but also consistent with zero. We are currently checking these results and performing the calculation in several different ways. But we are consistently finding that there is no enhancement of global warming trends due to the inclusion of the poorly ranked US stations.

### Has zero influence on climate modeling

Archer 9 – Professor of Geophysical Sciences @ Chicago

David Archer, professor of geophysical sciences at the University of Chicago, “The Long Thaw,” pg. 32

One oft-discussed issue with regard to the reconstruction of average temperature is called the urban heat island effect. Paved land is measurably warmer than vegetated land, no doubt about it, because vegetated land cools by evaporation. The question is whether any warming in the computed average temperature could actually be the urban heat island effect instead of global warming. Hot urban centers are part of the Earth, and they do contribute to the average temperature of the Earth, but their warmth is not caused by rising CO2 concentration. The easiest solution is to throw out urban data, by picking it out by hand, to leave the average temperature of the non-urban Earth. This is a subjective, imprecise task, but replicate studies find that it makes little difference to the global average whether urban areas are excluded or not. It turns out to be a non-issue. Independent, competing studies produce very similar-looking global average land temperature records, regardless of how they deal with urban heat island effects (Figure 4). So unless someone comes up with believable proof that the urban heat island is important, we'll not worry about it.

## Yes Positive Feedbacks

### Warming creates positive feedbacks – exponentially increases the impact – on the brink

Hansen 8 – Professor of Earth and Environmental Science

James E. Hanson, head of the NASA Goddard Institute for Space Studies in New York City and adjunct professor in the Department of Earth and Environmental Science at Columbia University, Al Gore’s science advisor, “Briefing before the Select Committee on Energy Independence and Global Warming,” US House of Representatives, 6-23-2008, “Twenty years later: tipping points near on global warming,” <http://www.columbia.edu/~jeh1/2008/TwentyYearsLater_20080623.pdf>

Fast feedbacks—changes that occur quickly in response to temperature change—amplify the initial temperature change, begetting additional warming. As the planet warms, fast feedbacks include more water vapor, which traps additional heat, and less snow and sea ice, which exposes dark surfaces that absorb more sunlight. Slower feedbacks also exist. Due to warming, forests and shrubs are moving poleward into tundra regions. Expanding vegetation, darker than tundra, absorbs sunlight and warms the environment. Another slow feedback is increasing wetness (i.e., darkness) of the Greenland and West Antarctica ice sheets in the warm season. Finally, as tundra melts, methane, a powerful greenhouse gas, is bubbling out. Paleoclimatic records confirm that the long-lived greenhouse gases— methane, carbon dioxide, and nitrous oxide—all increase with the warming of oceans and land. These positive feedbacks amplify climate change over decades, centuries, and longer. The predominance of positive feedbacks explains why Earth’s climate has historically undergone large swings: feedbacks work in both directions, amplifying cooling, as well as warming, forcings. In the past, feedbacks have caused Earth to be whipsawed between colder and warmer climates, even in response to weak forcings, such as slight changes in the tilt of Earth’s axis.2 The second fundamental property of Earth’s climate system, partnering with feedbacks, is the great inertia of oceans and ice sheets. Given the oceans’ capacity to absorb heat, when a climate forcing (such as increased greenhouse gases) impacts global temperature, even after two or three decades, only about half of the eventual surface warming has occurred. Ice sheets also change slowly, although accumulating evidence shows that they can disintegrate within centuries or perhaps even decades. The upshot of the combination of inertia and feedbacks is that additional climate change is already “in the pipeline”: even if we stop increasing greenhouse gases today, more warming will occur. This is sobering when one considers the present status of Earth’s climate. Human civilization developed during the Holocene (the past 12,000 years). It has been warm enough to keep ice sheets off North America and Europe, but cool enough for ice sheets to remain on Greenland and Antarctica. With rapid warming of 0.6°C in the past 30 years, global temperature is at its warmest level in the Holocene.3 The warming that has already occurred, the positive feedbacks that have been set in motion, and the additional warming in the pipeline together have brought us to the **precipice of a planetary tipping point**. We are at the tipping point because the climate state includes large, ready positive feedbacks provided by the Arctic sea ice, the West Antarctic ice sheet, and much of Greenland’s ice. **Little additional forcing is needed** to trigger these feedbacks and magnify global warming. If we go over the edge, we will transition to an environment far outside the range that has been experienced by humanity, and there will be no return within any foreseeable future generation. Casualties would include more than the loss of indigenous ways of life in the Arctic and swamping of coastal cities. An intensified hydrologic cycle will produce both greater floods and greater droughts. In the US, the semiarid states from central Texas through Oklahoma and both Dakotas would become more drought-prone and ill suited for agriculture, people, and current wildlife. Africa would see a great expansion of dry areas, particularly southern Africa. Large populations in Asia and South America would lose their primary dry season freshwater source as glaciers disappear. A major casualty in all this will be wildlife.

## Must Act Now

### Must act now – solves risky and expensive solutions in crisis

Carnesale 11 – Professor of Engineering @ UCLA

Albert, PhD in Nuclear Engineering, UCLA Chancellor Emeritus, Professor of Public Policy and Mechanical and Aerospace Engineering, 3-2011, “America’s Climate Choices,” http://americasclimatechoices.org/ACC\_Final\_Report\_Brief04.pdf

In the judgment of this report’s authoring committee, the environmental, economic, and humanitarian risks posed by climate change indicate a pressing need for substantial action to limit the magnitude of climate change and to prepare for adapting to its impacts. There are many reasons why it is imprudent to delay such actions, for instance: • The sooner that serious efforts to reduce greenhouse gas emissions proceed, the lower the risks posed by climate change, and the less pressure there will be to make larger, more rapid, and potentially more expensive reductions later. • Some climate change impacts, once manifested, will persist for hundreds or even thousands of years, and will be difficult or impossible to “undo.” In contrast, many actions taken to respond to climate change could be reversed or scaled back, if they some how prove to be more stringent than actually needed.

### Only action now solves future catastrophe

Antholis and Talbott 10 – Director and President @ Brookings

William Antholis, managing director of the Brookings Institution and a senior fellow in Governance Studies, former director of studies at the German Marshall Fund of the United States, and Strobe Talbott, president of the Brookings Institution, deputy Sec. of State under Clinton, “The Global Warming Tipping Point,” The Globalist, http://www.theglobalist.com/storyid.aspx?StoryId=8523

Moreover, we need to start reductions now in order to slow temperature rise later. Even if we could flip a switch and shut down all emissions, gases that are already in the atmosphere will continue to trap heat for some time to come. Once emitted into the atmosphere, a molecule of carbon dioxide, or CO2, lingers for decades. So gases emitted today are added to ones that have been around for 50 years or more. The current concentration of CO2 in the atmosphere is about 385 parts per million (ppm) and growing by two ppm each year. If we continue with current warming trends, the globe could keep warming for millennia. Even if the human species is biologically resilient enough to survive for centuries, the human enterprise may well be hard to maintain in anything like its current form. Today, humanity is cumulatively emitting, on a yearly basis, around 30 gigatons of CO2. A gigaton is a billion tons. Thirty gigatons is about the weight of 8,000 Empire State Buildings, which, if stacked one on top of another, would reach almost 2,000 miles into space. Of those 30 gigatons of CO2 that will be emitted this year, just under six gigatons are from the United States. To keep CO2 concentrations below 400 ppm and thereby keep temperature rise below 3.6°F, we should use the next four decades to cut the current output of 30 gigatons a year approximately in half. Thirty gigatons is about the weight of 8,000 Empire State Buildings, which, if stacked one on top of another, would reach almost 2,000 miles into space. So that is another target for mitigation: a staged process that would bring the global annual output down to 15 gigatons a year by 2050. To reach that goal, we have to build a new worldwide system for generating and using energy. We have to begin quickly in order to achieve the bulk of the necessary cuts between 2020 and 2035 so that there is some hope that, by 2050, emissions will have come down to 15 gigatons, concentrations will have stabilized below the 400 ppm level — and temperature rise will have flattened out before hitting the 3.6°F mark. At the heart of this mammoth undertaking is a transition from a high-carbon to a low-carbon global economy — that is, one that is powered as much as possible by forms of energy that do not burn fossil fuels and therefore do not pump CO2 into the atmosphere.

### Acting now is key to avoiding tipping points

Strom 7 – Professor of Planetary Science @ U of Arizona

Robert Strom, studied climate change for 15 years, the former Director of the Space Imagery Center, Professor of planetary sciences @ U of Arizona, "Hot House", SpringerLink, p. 123

We do not have time to spare. We must act now. Delaying action will require a much greater effort later to achieve the same temperature target. Even a 5-year delay is significant, given the current increase in C02 emissions. If action is delayed 20 years, rates of emission reduction will need to be 3 to 7 times greater to meet the same temperature target (Schellnhuber et al., 2006). In the absence of urgent and strenuous reduction in greenhouse gas emissions, the world will be committed to at least a 0.5 to 2 °C rise by 2050, and it could be considerably more because of the factors mentioned earlier. None of the greenhouse gas or temperature projections take into account the possibility of crossing a threshold that leads to an abrupt climate warming by the catastrophic release of natural greenhouse gases or some other cause. Although this is considered unlikely, we do not know in detail how these abrupt changes are triggered. Could the rise of atmospheric greenhouse gases and the complex interactions of other warming conditions set one of these events into motion? We do not know, but if it happened we would be in the **worst trouble imaginable**.

## Brink of Runaway Warming

### Tipping points now – on the brink of runaway warming

Speth 8 – Dean of Yale school of Forestry

James, dean of the Yale School of Forestry and Environmental Studies at Yale University, New Haven, Connecticut. Currently he serves the school as the Carl W. Knobloch, Jr. Dean and Sara Shallenberger Brown Professor in the Practice of Environmental Policy, The Bridge @ the Edge of the World, pg. 26

The possibility of abrupt climate change is linked to what may be the most problematic possibility of all—"positive" feedback effects where the initial warming has effects that generate more warming. Several of these feedbacks are possible. First, the land's ability to store carbon could weaken. Soils and forests can dry out or burn and release carbon; less plant growth can occur, thus reducing nature's ability to remove carbon from the air. Second, carbon sinks in the oceans could also be reduced due to ocean warming and other factors. Third, the potent greenhouse gas methane could be released from peat bogs, wetlands, and thawing permafrost, and even from the methane hydrates in the oceans, as the planet warms and changes. Finally, the earth's albedo, the reflectivity of the earth's surface, is slated to be reduced as large areas now covered by ice and snow diminish or are covered by meltwater. All these effects would tend to **make warming self-reinforcing**, possibly leading to a greatly amplified greenhouse effect. The real possibility of these amplifying feedbacks has alarmed some of our top scientists. James Hansen, the courageous NASA climate scientist, is becoming increasingly outspoken as his investigations lead him to more and more disturbing conclusions. He offered the following assessment in 2007: "Our home planet is now **dangerously near a 'tipping point**.' Human-made greenhouse gases are near a level such that important climate changes may proceed mostly under the climate system's own momentum. Impacts would include **extermination of a large fraction of species on the planet**, shifting of climatic zones due to an intensified hydrologic cycle with effects on freshwater availability and human health, and repeated worldwide coastal tragedies associated with storms and a continuously rising sea level. .. . "Civilization developed during the Holocene, a period of relatively tranquil climate now almost 12,000 years in duration. The planet has been warm enough to keep ice sheets off North America and Europe, but cool enough for ice sheets on Greenland and Antarctica to be stable. Now, with rapid warming of o.6°C in the past 30 years, global temperature is at its warmest level in the Holocene. "This warming has brought us to the precipice of a great 'tipping point” If we go over the edge, it will be a transition to 'a different planet,' an environment far outside the range that has been experienced by humanity. There **will be no return** within the lifetime of any generation that can be imagined, and the trip will **exterminate a large fraction of species on the planet.**

## Brink of Biodiversity Loss

### On the brink of massive biodiversity loss

Speth 8 – Dean of Yale school of Forestry

James, dean of the Yale School of Forestry and Environmental Studies at Yale University, New Haven, Connecticut. Currently he serves the school as the Carl W. Knobloch, Jr. Dean and Sara Shallenberger Brown Professor in the Practice of Environmental Policy, The Bridge @ the Edge of the World, pg. 37

The cumulative effect of all the factors is that species loss today is estimated to be about a thousand times the natural or normal rate that species go extinct.65 Many scientists believe we are on the **brink of the sixth great wave of species** **loss** on earth, the only one caused by humans. The World Conservation Union, which keeps the books on species, estimates that two of every five recognized species on the planet risk extinction, including one in eight birds, one in four mammals, and one in three amphibians.66 Almost 95 percent of the leather-back turtles in the Pacific have disappeared in the past twenty years;67 at least nine and perhaps 122 amphibian species have gone extinct since 1980;68 tigers are on the verge of extinction in the wild 69 populations of nearly half the world's waterbird species are in decline, and populations of twenty common American meadow birds like the bobwhite and the meadowlark have lost more than half their populations in forty years.

## Extinction

### Global Warming Causes Extinction

Romm 10 – Editor of Climate Progress, Senior Fellow at the American Progress, former Acting Assistant Secretary of Energy for Energy Efficiency and Renewable Energy, Fellow of the American Association for the Advancement of Science, (Jon, “Disputing the “consensus” on global warming,” <http://climateprogress.org/2010/06/16/scientific-consensus-on-global-warming-climate-science/>,) ASINGH

**A good example of how scientific evidence drives our understanding concerns how we know that humans are the dominant cause of global warming**. This is, of course, the deniers’ favorite topic. Since it is increasingly obvious that the climate is changing and the planet is warming, the remaining deniers have coalesced to defend their Alamo — that human emissions aren’t the cause of recent climate change and therefore that reducing those emissions is pointless. Last year, longtime Nation columnist [Alexander Cockburn wrote](http://www.counterpunch.org/cockburn04282007.html" \t "_blank), “There is still zero empirical evidence that anthropogenic production of CO2 is making any measurable contribution to the world’s present warming trend. The greenhouse fearmongers rely entirely on unverified, crudely oversimplified computer models to finger mankind’s sinful contribution.” In fact, the evidence is amazingly strong. Moreover, if the relatively complex climate models are oversimplified in any respect, it is by omitting amplifying feedbacks and other factors that suggest human-caused climate change will be worse than is widely realized. The [IPCC concluded](http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch09.pdf" \t "_blank) last year: “Greenhouse gas forcing has very likely (>90 percent) caused most of the observed global warming over the last 50 years. This conclusion takes into account … the possibility that the response to solar forcing could be underestimated by climate models.” Scientists have come to understand that “forcings” (natural and human-made) explain most of the changes in our climate and temperature both in recent decades and over the past millions of years. The primary human-made forcings are the heat-trapping greenhouse gases we generate, particularly carbon dioxide from burning coal, oil and natural gas. The natural forcings include fluctuations in the intensity of sunlight (which can increase or decrease warming), and major volcanoes that inject huge volumes of gases and aerosol particles into the stratosphere (which tend to block sunlight and cause cooling**)…. Over and over again, scientists have demonstrated that observed changes in the climate in recent decades can only be explained by taking into account the observed combination of human and natural forcings.** Natural forcings alone just don’t explain what is happening to this planet. For instance, in April 2005, one of the nation’s top climate scientists, NASA’s James Hansen, led a team of scientists that made “precise measurements of increasing ocean heat content over the past 10 years,” which revealed that the Earth is absorbing far more heat than it is emitting to space, confirming what earlier computer models had shown about warming. [Hansen called](http://www.columbia.edu/~jeh1/imbalance_release.pdf" \t "_blank) this energy imbalance the “smoking gun” of climate change, and said, “There can no longer be genuine doubt that human-made gases are the dominant cause of observed warming.” Another 2005 study, led by the Scripps Institution of Oceanography, compared actual ocean temperature data from the surface down to hundreds of meters (in the Atlantic, Pacific and Indian oceans) with climate models and [concluded](http://www.sciencemag.org/cgi/content/abstract/1112418" \t "_blank): A warming signal has penetrated into the world’s oceans over the past 40 years. The signal is complex, with a vertical structure that varies widely by ocean; it cannot be explained by natural internal climate variability or solar and volcanic forcing, but is well simulated by two anthropogenically [human-caused] forced climate models. We conclude that it is of human origin, a conclusion robust to observational sampling and model differences. Such studies are also done for many other observations: land-based temperature rise, atmospheric temperature rise, sea level rise, arctic ice melt, inland glacier melt, Greeland and Antarctic ice sheet melt, expansion of the tropics (desertification) and changes in precipitation. Studies compare every testable prediction from climate change theory and models (and suggested by paleoclimate research) to actual observations. How many studies? Well, the **IPCC’s definitive treatment of the subject, “Understanding and Attributing Climate Change,” has 11 full pages of references, some 500 peer-reviewed studies. This is not a consensus of opinion. It is what scientific research and actual observations reveal. And the science behind human attribution has gotten much stronger in the past 2 years** (see a recent literature review by the Met Office [here](http://www.metoffice.gov.uk/corporate/pressoffice/2010/pr20100305.html)). That brings us to another problem with the word “consensus.” It can mean “unanimity” or “the judgment arrived at by most of those concerned.” Many, if not most, people hear the second meaning: “consensus” as majority opinion. The scientific consensus most people are familiar with is the IPCC’s “Summary for Policymakers” reports. But those aren’t a majority opinion. Government representatives participate in a line-by-line review and revision of these summaries. So China, Saudi Arabia and that hotbed of denialism — the Bush administration — get to veto anything they don’t like. The deniers call this “politicized science,” suggesting the process turns the IPCC summaries into some sort of unscientific exaggeration. In fact, the reverse is true. The net result is unanimous agreement on a conservative or watered-down document. You could argue that rather than majority rules, this is “minority rules.” Last April, in an article titled “Conservative Climate,” [Scientific American](http://www.sciam.com/article.cfm?chanID=sa006&articleID=5B9E73AD-E7F2-99DF-3F71280BCE41ED77&colID=5" \t "_blank) noted that objections by Saudi Arabia and China led the IPCC to remove a sentence stating that the impact of human greenhouse gas emissions on the Earth’s recent warming is five times greater than that of the sun. In fact, lead author Piers Forster of the University of Leeds in England said, “The difference is really a factor of 10.” Then I discuss the evidence we had even back in 2008 that the IPCC was underestimating key climate impacts, a point I [update here](http://climateprogress.org/2010/02/18/ipcc-lowballs-impacts-pachauri-disband/). The bottom line is that recent observations and research make clear the planet almost certainly faces a greater and more imminent threat than is laid out in the IPCC reports. That’s why climate scientists are so desperate. That’s why they keep begging for immediate action. And that’s why the “consensus on global warming” is a phrase that should be forever retired from the climate debate. The leading scientific organizations in this country and around the world, including all the major national academies of science, aren’t buying into some sort of consensus of opinion. They have analyzed the science and observations and expressed their understanding of climate science and the likely impacts we face on our current emissions path — an understanding that has grown increasingly dire in recent years (see “[An illustrated guide to the latest climate science](http://climateprogress.org/2010/02/17/an-illustrated-guide-to-the-latest-climate-science/)” and “[An introduction to global warming impacts: Hell and High Water](http://climateprogress.org/2009/03/22/an-introduction-to-global-warming-impacts-hell-and-high-water/)“).

## Biodiversity

### Warming leads to invasive species – collapses biodiversity

Olmstead 11 – JD, founder of the CPC

James Olmstead, JD, founder of Conservation and Preservation Counsel, a law firm devoted to representing land trusts and landowners in land preservation acquisitions, 2011, “THE BUTTERFLY EFFECT: CONSERVATION EASEMENTS, CLIMATE CHANGE, AND INVASIVE SPECIES,” 38 B.C. Envtl. Aff. L. Rev. 41, Lexis

Global warming will cause unpredictable and destabilizing migrations of species, many of which will become invasive in their new biomes. 237 Such **invasions will cause extinctions**, and extinctions will **decrease biodiversity**. 238 Without biodiversity we will lose ecological services. 239 We will also lose the complexity and uniqueness of each one of thousands of species that we **will drive to extinction**. Because land trusts are carrying most of the burden of saving natural lands in the United States and other nations, it falls to the land trust community, and to its oversight institutions such as the Land Trust Alliance, 240 to address the stark reality of climate-change-driven harmful invasions. Indeed, land trusts and the Land Trust Alliance must make it their prime imperative to alter this ecologically fatal trajectory we have embarked upon for the sake of wealth and convenience.

### Warming collapses biodiversity – outweighs all alternate causes

Hansen 8 – Professor of Earth Sciences @ Columbia

James E, Head of the NASA Goddard Institute for Space Studies in New York City and adjunct professor in the Department of Earth and Environmental Science at Columbia University. Al Gore’s science advisor. Introductory chapter for the book State of the Wild. “Tipping point: Perspective of a Scientist.” April. http://www.columbia.edu/~jeh1/2008/StateOfWild\_20080428.pdf

Climate change is emerging while the wild is stressed by other pressures— habitat loss, overhunting, pollution, and invasive species—and it will magnify these stresses. Species will respond to warming at differing paces, affecting many others through the web of ecological interactions. Phenological events, which are timed events in the life cycle that are usually tied to seasons, may be disrupted. Examples of phenological events include when leaves and flowers emerge and when animals depart for migration, breed, or hibernate. If species depend on each other during those times—for pollination or food— the pace at which they respond to warmer weather or precipitation changes may cause unraveling, cascading effects within ecosystems. Animals and plants respond to climate changes by expanding, contracting, or shifting their ranges. Isotherms, lines of a specific average temperature, are moving poleward by approximately thirty-five miles (56 km) per decade, meaning many species ranges may in turn shift at that pace.4 Some already are: the red fox is moving into Arctic fox territory, and ecologists have observed that 943 species across all taxa and ecosystems have exhibited measurable changes in their phenologies and/or distribution over the past several decades.5 However, their potential routes and habitat will be limited by geographic or human-made obstacles, and other species’ territories. Continued business-as-usual greenhouse gas emissions threaten many ecosystems, which together form the fabric of life on Earth and provide a wide range of services to humanity. Some species face extinction. The following examples represent a handful. Of particular concern are polar species, because they are being pushed off the planet. In Antarctica, Adelie and emperor penguins are in decline, as shrinking sea ice has reduced the abundance of krill, their food source.6 Arctic polar bears already contend with melting sea ice, from which they hunt seals in colder months. As sea ice recedes earlier each year, populations of polar bears in Canada have declined by about 20 percent, with the weight of females and the number of surviving cubs decreasing a similar amount. As of this writing, the US Fish and Wildlife Service is still considering protecting polar bears, but only after it was taken to court for failure to act on the mounting evidence that polar bears will suffer greatly due to global warming. 7 Life in many biologically diverse alpine regions is similarly in danger of being pushed off the planet. When a given temperature range moves up a mountain, the area with those climatic conditions becomes smaller and rockier, and the air thinner, resulting in a struggle for survival for some alpine species. In the Southwest US, the endemic Mount Graham red squirrel survives on a single Arizona mountain, an “island in the sky,” an isolated green spot in the desert. The squirrels, protected as an endangered species, had rebounded to a population of over 500, but their numbers have since declined to between 100 and 200 animals.8 Loss of the red squirrel will alter the forest because its middens are a source of food and habitat for chipmunks, voles, and mice. A new stress on Graham red squirrels is climatic: increased heat, drought, and fires. Heat-stressed forests are vulnerable to prolonged beetle infestation and catastrophic fires. Rainfall still occurs, but it is erratic and heavy, and dry periods are more intense. The resulting forest fires burn hotter, and the lower reaches of the forest cannot recover. In the marine world, loggerhead turtles are also suffering. These great creatures return to beaches every two to three years to bury a clutch of eggs. Hatchlings emerge after two months and head precariously to the sea to face a myriad of predators. Years of conservation efforts to protect loggerhead turtles on their largest nesting area in the US, stretching over 20 miles of Florida coastline, seemed to be stabilizing the South Florida subpopulation. 9 Now climate change places a new stress on these turtles. Florida beaches are increasingly lined with sea walls to protect against rising seas and storms. Sandy beaches seaward of the walls are limited and may be lost if the sea level rises substantially. Some creatures seem more adaptable to climate change. The armadillo, a prehistoric critter that has been around for over 50 million years, is likely to extend its range northward in the US. But the underlying cause of the climatic threat to the Graham red squirrel and other species—from grizzlies, whose springtime food sources may shift, to the isolated snow vole in the mountains of southern Spain—is “business-as-usual” use of fossil fuels. Predicted warming of several degrees Celsius would surely cause mass extinctions. Prior major warmings in Earth’s history, the most recent occurring 55 million years ago with the release of large amounts of Arctic methane hydrates,10 resulted in the extinction of half or more of the species then on the planet. Might the Graham red squirrel and snow vole be “saved” if we transplant them to higher mountains? They would have to compete for new niches— and there is a tangled web of interactions that has evolved among species and ecosystems. What is the prospect that we could understand, let alone reproduce, these complex interactions that create ecological stability? “Assisted migration” is thus an uncertain prospect. 11 The best chance for all species is a conscious choice by humans to pursue an alternative energy scenario to stabilize the climate.

### Collapses half of all species

Stern 7 – Professor of Economics and Government

Nicholas- Head of the British Government Economic Service, Former Head Economist for the World Bank, I.G. Patel Chair at the London School of Economics and Political Science, “The Economics of Climate Change: The Stern Review”, The report of a team commissioned by the British Government to study the economics of climate change led by Siobhan Peters, Head of G8 and International Climate Change Policy Unit, Cambridge University Press, p. 79-81

Climate change is likely to occur too rapidly for many species to adapt. One study estimates that around 15 – 40% of species face extinction with 2°C of warming. Strong drying over the Amazon, as predicted by some climate models, would result in dieback of forest with the highest biodiversity on the planet. The warming of the 20th century has already directly affected ecosystems. Over the past 40 years, species have been moving polewards by 6 Km on average per decade, and seasonal events, such as flowering or egg-laying, have been occurring several days earlier each decade.72 Coral bleaching has become increasingly prevalent since the 1980s. Arctic and mountain ecosystems are acutely vulnerable – polar bears, caribou and white spruce have all experienced recent declines.73 Climate change has already contributed to the extinction of over 1 % of the world’s amphibian species from tropical mountains.74 Ecosystems will be highly sensitive to climate change (Table 3.4). For many species, the rate of warming will be too rapid to withstand. Many species will have to migrate across fragmented landscapes to stay within their “climate envelope” (at rates that many will not be able to achieve). Migration becomes more difficult with faster rates of warming. In some cases, the “climate envelope” of a species may move beyond reach, for example moving above the tops of mountains or beyond coastlines. Conservation reserves may find their local climates becoming less amenable to the native species. Other pressures from human activities, including land-use change, harvesting/hunting, pollution and transport of alien species around the world, have already had a dramatic effect on species and will make it even harder for species to cope with further warming. Since 1500, 245 extinctions have been recorded across most major species groups, including mammals, birds, reptiles, amphibians, and trees. A further 800 known species in these groups are threatened with extinction.7 A warming world will accelerate species extinctions and has the potential to lead to the irreversible loss of many species around the world, with most kinds of animals and plants affected (see below). Rising levels of carbon dioxide have some direct impacts on ecosystems and biodiversity,76 but increases in temperature and changes in rainfall will have even more profound effects. Vulnerable ecosystems are likely to disappear almost completely at even quite moderate levels of warming.77 The Arctic will be particularly hard hit, since many of its species, including polar bears and seals, will be very sensitive to the rapid warming predicted and substantial loss of sea ice (more detail in Chapter 5).78 1°C warming. At least 10% of land species could be facing extinction, according to one stud y.79 Coral reef bleaching will become much more frequent, with slow recovery, particularly in the southern Indian Ocean, Great Barrier Reef and the Caribbean.80 Tropical mountain habitats are very species rich and are likely to lose many species as suitable habitat disappears. 2°C warming. Around 15 – 40% of land species could be facing extinction, with most major species groups affected, including 25 – 60% of mammals in South Africa and 15 – 25% of butterflies in Australia. Coral reefs are expected to bleach annually in many areas, with most never recovering, affecting tens of millions of people that rely on coral reefs for their livelihood or food supply.81 This level of warming is expected to lead to the loss of vast areas of tundra and forest – almost half the low tundra and about one-quarter of the cool conifer forest according to one study. 82 3°C warming. Around 20 – 50% of land species could be facing extinction. Thousands of species may be lost in biodiversity hotspots around the world, e.g. over 40% of endemic species in some biodiversity hotspots such as African national parks and Queensland rain forest. 83 Large areas of coastal wetlands will be permanently lost because of sea level rise (up to one-quarter according to some estimates), with acute risks in the Mediterranean, the USA and South East Asia. Mangroves and coral reefs are at particular risk from rapid sea level rise (more than 5 mm per year) and their loss would remove natural coastal defences in many regions. Strong drying over the Amazon, according to some climate models, would result in dieback of forest with the highest biodiversity on the planet. 84 Temperatures could rise by more than 4 or 5°C if emissions continue unabated, but the full range of consequences at this level of warming have not been clearly articulated to date. Nevertheless, a basic understanding of ecological processes leads quickly to the conclusion that many of the ecosystem effects will become compounded with increased levels of warming, particularly since small shifts in the composition of ecosystems or the timing of biological events will have knock-on effects through the food- chain (e.g. loss of pollinators or food supply).85

### Warming causes mass Co2 levels which kills biodiversity – Artic example <<note you can also read the hardy card>>

Barnes and Peck 08 – Both are part of the British Antarctic Survey, Natural Environment Research Council, High Cross, Madingley Road, Cambridge CB3 0ET, UK (Vulnerability of Antarctic shelf biodiversity to predicted regional warming, Vol. 37: 149–163, 2008 <http://www.feriaantarticaescolar.cl/doc/disponibles_inach/5%20Barnes-vulnerability%20Antarctic%20shelf%20biodiversity.pdf>)

The western Antarctic Peninsula (WAP) is one of the most rapidly changing ecosystems on the planet and an area of rich biodiversity, most of which has been described to lie on the continental shelf (Clarke & Johnston 2003). How will this rich and largely endemic fauna respond to current and predicted regional warming? There are 2 main approaches that have been used to analyse potential responses, physiological and ecological, and these have a marked schism in the predicted outcomes. Physiological experiments over the last few decades have suggested some marine ectotherms may be sensitive to even small increases in temperature, but some ecological information on distributions contrasts with such an assessment. With rates of global climate change accelerating, bridging the gap between these approaches and moving the field towards a realistic understanding of likely ecosystem responses is the focus of this manuscript. In the last decade we have gathered an unparalleled quantity and quality of information about past environmental change. Examination of gas bubbles and oxygen isotopes in ice cores from a variety of sites in Greenland and Antarctica have revealed the details of some atmospheric changes throughout the last and previous 7 glacial cycles (EPICA 2004). Comparison of trends of CO2, other drivers and temperature in ice cores have now given us a good picture of climate change in the past 800 thousand years (800 kyr) and, thus, the context for current change. Even recently (in the last interglacial period) our planet has been warmer than at present, and CO2, CH4 (methane) and surface temperature have all changed rapidly before, but we are now in a time of dramatic change unlike any for which we have a detailed record (EPICA 2004). Levels of atmospheric CO2 are now higher than at any point during the last 800 kyr, and are rising rapidly. Raupach et al. (2007) reported that the rate of global CO2 emissions has tripled from 1.1% yr–1 in the last decade to >3% yr–1 in the current decade. Historic records show that 21 of the hottest 22 yr (air temperatures) on record have been since 1980 and the 4 hottest years have all been in the last decade. This warming is unevenly distributed, with the most intensively warming areas concentrated around parts of the 2 polar regions (Hansen et al. 2006). The WAP is one of the localities showing the most rapidly warming air temperatures (King et al. 2003). Recently it was detected that a significant increase in sea temperatures has been building up in the Bellingshausen Sea over the last 50 yr (Meredith & King 2005). The decrease in the extent of arctic sea ice is regularly discussed with concern by the scientific and popular media, but the duration and extent of seasonal sea ice to the west of the Antarctic Peninsula (AP) has substantially decreased, with less acclaim (Zwally et al. 2002). Along the AP both the number of glaciers in retreat and the rate at which they are retreating have increased (Cook et al. 2005). Rapid rises in CO2 and temperature, and the physical responses to these, such as glacial retreat, surface freshening, ocean acidification, amongst others, have a drastic potential to influence life on earth. The earth’s system is, therefore, in a period of change unprecedented in recent geological time, and the AP is possibly the fastest changing site on the planet. It is in such places that we should look first to identify the changes in and responses of the species, communities and ecosystems living there. Although some changes over decades have been noted in both pelagic (Atkinson et al. 2004) and benthic (Barnes et al. 2006a) populations of the Southern Ocean, whether these are linked to regional warming is currently uncertain. There has been a marked response of life to elevated temperatures in the terrestrial environment of the AP (Walther et al. 2002). The high thermal capacity of water means that the physical rates of change in the sea are different. In addition, Antarctic marine animals differ considerably in their physiology, longevity, growth rates and many other aspects to the few types that live on land (Arntz et al. 1994, Peck et al. 2006). Amongst the traits that characterise Antarctic marine animals is that they may be amongst the most sensitive of any large region on earth to predicted climate change (Peck 2005, Clarke et al. 2007). In the current paper we concentrate on the marine environment around Antarctica about which we know most, i.e. the continental shelf (0 to 1000 m). We calculate, using a variety of sources (satellite imagery, aerial photo mosaics, swath bathymetry, existing bathymetric maps and estimates of grounding lines of ice-sheets), that the continental shelf around Antarctica covers about 4 376 000 km2 and that about 34% of the shelf currently lies under ice (Fig. 1). New areas of the continental shelf are emerging from parts of ice shelves, such as the Filchner and Larsen, which have collapsed, but ice shelves cyclically grow and their outer margins disintegrate. In the last few decades the Ross Ice Shelf has grown, so, despite the recent collapse of various ice shelves elsewhere around Antarctica, we calculate the net emergence of continental shelf from under ice sheets to be only approximate to 1% of Antarctica’s total continental shelf area, but if the Ross Ice Shelf entered a cycle of regression this could be altered markedly. Recent scientific cruises have provided new insight into life on areas of the continental shelf that were, but are no longer, under ice shelves. Drilling through ice shelves has revealed life and even colonisation histories in the dark underneath (e.g. Post et al. 2007). Despite this, virtually all of what we know about physical conditions and life on the Antarctic shelf is from the 65% that is not covered by ice shelves, and it is this region that we concentrate on in the current study.

## Hegemony

### Warming destroys the US Navy’s ability to win the artic conflict – facilitates belligerence – on the brink now

MSNBC 11 – (Navy's got new challenges with warming, experts say Report: Arctic role will grow; bases will be vulnerable to storms, rising seas, <http://www.msnbc.msn.com/id/41990999/ns/us_news-environment/t/navys-got-new-challenges-warming-experts-say/>)

**The U.S. Navy should plan for climate change impacts** — **from costly base repairs, to mobilizing for humanitarian aid and geopolitical conflicts in the Arctic** — [the National Research Council said in a report](http://www.nap.edu/catalog.php?record_id=12914) Thursday. "Even the most moderate predicted trends in climate change will present new national security challenges," retired Adm. Frank Bowman, co-chair of the committee that wrote the report at the Navy's request, said in a statement. "**Naval forces need to monitor more closely and start preparing now for projected challenges climate change will present in the future**," he added. As rising temperatures continue to melt sea ice, **Arctic sea lanes could be regularly open across the Arctic by 2030,** the report noted. **The region is already seeing ships testing the waters, as well as nations lining up to seek energy and mineral deposits. Russia has been among the most aggressive in seeking energy riches,** while Canada has beefed up its patrols**.** "The geopolitical situation in the Arctic region has become complex and nuanced, despite the area being essentially ignored since the end of the Cold War," the experts wrote. In order to protect U.S. interests, they added, "the Navy should begin Arctic training and the Marine Corps should also reestablish a cold-weather training program. Rising sea levels and more extreme storm surges tied to warming could also become costly for the Navy. A rise of three feet, the experts said, would place at risk 56 Navy installations worth $100 billion. The Navy should expect a rise by 2100 anywhere between a foot and six feet, they added. The report also urged the Navy to increase its capacity for helping climate refugees via hospital ships. "**Naval forces must be prepared to provide more aid and disaster relief in the decades ahead," said panel co-chair Antonio Busalacchi, director of the Earth System Science Interdisciplinary Center at the University of Maryland.**

### Left unchecked, these disputes lead to a US-Russia war

**Zellen, 07**- Security Innovator – (Barry, “The Polar Show Down: As the Arctic's ice begins to melt, a new race for its undersea resources begins” August 23, 2007 <http://securityinnovator.com/index.php?articleID=12387&sectionID=43>)

In response to Russia’s aggressive assertion of its claims to the Arctic, Cohen believes that “legal and diplomatic actions are necessary,” and pointed out that the U.S. State Department has “already expressed its skepticism of planting of the Russian Flag,” and believes the act was “not in legal effect.” Cohen added that “Canada joined in this opposition,” noting its Prime Minister, Stephen Harper, quickly embarked upon a “three-day Arctic trip” during which he made major announcements that “increased Canada’s naval presence in the Arctic.” In order to “block Russia's grab,” Cohen believes that the United States “should encourage its friends and allies—especially Canada, Denmark, and Norway—to pursue their own claims with the United Nations Commission on the Limits of the Continental Shelf.” And while America “has not ratified LOST,” the Law of the Sea Treaty, Cohen noted the other Arctic states “have filed claims with the Commission in opposition to Russia's claims,” and believes “the U.S. should also encourage Canada to coordinate a possible claim through the International Justice Court in The Hague against the Russian grab, which the U.S. may join.” Cohen believes Moscow’s “decision to take an aggressive stand has left the U.S., Canada, and the Nordic countries little choice but to forge a cooperative high-north strategy and invite other friendly countries, such as Great Britain, to help build a Western presence in the Arctic: This will probably have to include a fleet of modern icebreakers, submersibles, geophysics/seismic vessels, and polar aircraft.” As Cohen explained, there’s “too much at stake to leave the Arctic to the Russian bear.” But in an optimistic “parting thought,” Cohen added, “I don’t think Russia has financial resources and technology to explore Artic for its riches alone,” and that it “would be much better if U.S., Canada, and—as well as Denmark and Norway will have a multilateral regime negotiated that will specify the economic zones, and will open each other’s resources for joint ventures that will boost economic development in the Arctic.” To understand Russia’s intentions, we interviewed Dr. Vladimir Frolov, the director of the National Laboratory for Foreign Policy, a Moscow-based think tank.[18] Frolov, a former Foreign Service officer, writes about Russia’s foreign policy for Russia Profile magazine and penned a prescient column in the July 17th edition titled “The Coming Conflict in the Arctic: Russia and U.S. to Square Off Over Arctic Energy Reserves.”[19] Frolov explained that “there are two principal lines of thinking on global warming in Russia. One is that global warming is a myth, the other is that global warming exists and it is good for Russia.” He added that “Russia might benefit from global warming if it leads to more mild temperatures in the Arctic, provided the problem of flooding could be solved,” because a milder climate “would make it less prohibitively costly to develop the considerable energy resources that Russia has there.” He noted that “Russia views the Arctic reserves as its ‘last barrel of oil’ to be safeguarded and then used to Russia’s strategic advantage,” much like the U.S. view of “oil exploration in the Arctic National Wildlife Refuge (ANWR).” So bountiful are Russia’s reserves of Arctic petroleum resources that Frolov thinks that they will precipitate an inevitable clash between Russia and the United States reminiscent of its Cold War clash across the Arctic. As Frolov explained in his July 17, 2007 column in Russia Profile, “the stage has been quietly set for a much more serious confrontation in the non-too-distant future between Russia and the United States—along with Canada, Norway and Denmark,” as Russia “recently laid claim to a vast 1,191,000 square km chunk of the ice-covered Arctic seabed.” Its claim is “not really about territory, but rather about the huge hydrocarbon reserves that are hidden on the seabed under the Arctic ice cap: these newly discovered energy reserves will play a crucial role in the global energy balance as the existing reserves of oil and gas are depleted over the next 20 years.”

## Oceans

**Even 1 degree of warming warms the oceans and causes catastrophic methane burps**  
**Atcheson 4 –** a geologist, has held a variety of policy positions in several federal government agencies. **(**John, “Ticking Time Bomb,” <http://www.commondreams.org/views04/1215-24.htm>)

The Arctic Council's recent report on the effects of global warming in the far north paints a grim picture: global floods, extinction of polar bears and other marine mammals, collapsed fisheries. But it ignored a ticking time bomb buried in the Arctic tundra. There are enormous quantities of naturally occurring greenhouse gasses trapped in ice-like structures in the cold northern muds and at the bottom of the seas. **These ices, called clathrates, contain 3,000 times as much methane as is in the atmosphere. Methane is more than 20 times as strong a greenhouse gas as carbon dioxide.** Now here's the scary part. A temperature increase of merely a few degrees would cause these gases to volatilize and "burp" into the atmosphere, which would further raise temperatures, which would release yet more methane, heating the Earth and seas further, and so on. There's 400 gigatons of methane locked in the frozen arctic tundra - enough to start this chain reaction - and the kind of warming the Arctic Council predicts is sufficient to melt the clathrates and release these greenhouse gases into the atmosphere. Once triggered, this cycle could result in runaway global warming the likes of which even the most pessimistic doomsayers aren't talking about. An apocalyptic fantasy concocted by hysterical environmentalists? Unfortunately, no. **Strong geologic evidence suggests something similar has happened at least twice before. The most recent of these catastrophes occurred about 55 million years ago in what geologists call the Paleocene-Eocene Thermal Maximum (PETM), when methane burps caused rapid warming and massive die-offs, disrupting the climate for more than 100,000 years.** The granddaddy of these catastrophes occurred 251 million years ago, at the end of the Permian period, when a series of methane burps came close to wiping out all life on Earth. More than 94 percent of the marine species present in the fossil record disappeared suddenly as oxygen levels plummeted and life teetered on the verge of extinction. Over the ensuing 500,000 years, a few species struggled to gain a foothold in the hostile environment. It took 20 million to 30 million years for even rudimentary coral reefs to re-establish themselves and for forests to regrow. In some areas, it took more than 100 million years for ecosystems to reach their former healthy diversity. Geologist Michael J. Benton lays out the scientific evidence for this epochal tragedy in a recent book, *When Life Nearly Died: The Greatest Mass Extinction of All Time*. As with the PETM, greenhouse gases, mostly carbon dioxide from increased volcanic activity, warmed the earth and seas enough to release massive amounts of methane from these sensitive clathrates, setting off a runaway greenhouse effect. The cause of all this havoc? In both cases, a temperature increase of about 10.8 degrees Fahrenheit, about the upper range for the average global increase today's models predict can be expected from burning fossil fuels by 2100. But these models could be the tail wagging the dog since they don't add in the effect of burps from warming gas hydrates. Worse, as the Arctic Council found, the highest temperature increases from human greenhouse gas emissions will occur in the arctic regions - an area rich in these unstable clathrates. If we trigger this runaway release of methane, there's no turning back. No do-overs. Once it starts, it's likely to play out all the way. Humans appear to be capable of emitting carbon dioxide in quantities comparable to the volcanic activity that started these chain reactions. According to the U.S. Geological Survey, burning fossil fuels releases more than 150 times the amount of carbon dioxide emitted by volcanoes - the equivalent of nearly 17,000 additional volcanoes the size of Hawaii's Kilauea. And that is the time bomb the Arctic Council ignored. How likely is it that humans will cause methane burps by burning fossil fuels? No one knows. But it is somewhere between possible and likely at this point, and it becomes more likely with each passing year that we fail to act. So forget rising sea levels, melting ice caps, more intense storms, more floods, destruction of habitats and the extinction of polar bears. Forget warnings that global warming might turn some of the world's major agricultural areas into deserts and increase the range of tropical diseases, even though this is the stuff we're pretty sure will happen. Instead, let's just get with the Bush administration's policy of pre-emption. **We can't afford to have the first sign of a failed energy policy be the mass extinction of life on Earth.**

**Oceanic bursts are more powerful than a nuclear war**   
**Ryskin 3 (Gregory, Department of Chemical Engineering, Northwestern University, Illinois, “Methane-driven oceanic eruptions and mass extinctions” Geology 31(9): 741-744, ASingh)**

Upon release of a significant portion of the dissolved methane, the ocean settles down, and the entire sequence of events (i.e., development of anoxia, accumulation of dissolved methane, the metastable state, eruption) begins anew. **No external cause is required to bring about a methane-driven eruption—its mechanism is self-contained, and implies that eruptions are likely to occur repeatedly at the same location**. Because methane is isotopically light, its fast release must result in a negative carbon isotope excursion in the geological record. Knowing the magnitude of the excursion, one can estimate the amount of methane that could have produced it. Such calculations (prompted by the methane-hydrate-dissociation model, but equally applicable here) have been performed for several global events in the geological record; the results range from ;1018 to 1019 g of released methane (e.g., Katz et al., 1999; Kennedy et al., 2001; de Wit et al., 2002). These are very large amounts: the total carbon content of today’s terrestrial biomass is ;2 3 1018 g. Nevertheless, relatively small regions of the deep ocean could contain such amounts of dissolved methane; e.g., the Black Sea alone (volume ;0.4 3 1023 of the ocean total; maximum depth only 2.2 km) could hold, at saturation, ;0.5 3 1018 g. A similar region of the deep ocean could contain much more (the amount grows quadratically with depth3). Released in a geological instant (weeks, perhaps), 1018 to 1019 g of methane could destroy the terrestrial life almost entirely**. Combustion and explosion of 0.75 3 1019 g of methane would liberate energy equivalent to 108 Mt of TNT, ;10,000 times greater than the world’s stockpile of nuclear weapons, implicated in the nuclear winter scenario (**Turco et al., 1991).

## War

### Global warming leads to mass and unending international conflict

Klare 6 – Professor of Peace and World Security Studies

Michael, professor of peace and world security studies at Hampshire College, The Coming Resource Wars, 3-10-2006, http://www.alternet.org/environment/33243

It's official: the era of resource wars is upon us. In a major London address, British Defense Secretary John Reid warned that global climate change and dwindling natural resources are combining to increase the likelihood of violent conflict over land, water and energy. Climate change, he indicated, "will make scarce resources, clean water, viable agricultural land even scarcer" -- and this will "make the emergence of violent conflict more rather than less likely." Although not unprecedented, Reid's prediction of an upsurge in resource conflict is significant both because of his senior rank and the vehemence of his remarks. "The blunt truth is that the lack of water and agricultural land is a significant contributory factor to the tragic conflict we see unfolding in Darfur," he declared. "We should see this as a warning sign." Resource conflicts of this type are most likely to arise in the developing world, Reid indicated, but the more advanced and affluent countries are not likely to be spared the damaging and destabilizing effects of global climate change. With sea levels rising, water and energy becoming increasingly scarce and prime agricultural lands turning into deserts, internecine warfare over access to vital resources will become a global phenomenon. Reid's speech, delivered at the prestigious Chatham House in London (Britain's equivalent of the Council on Foreign Relations), is but the most recent expression of a growing trend in strategic circles to view environmental and resource effects -- rather than political orientation and ideology -- as the most potent source of armed conflict in the decades to come. With the world population rising, global consumption rates soaring, energy supplies rapidly disappearing and climate change eradicating valuable farmland, the stage is being set for persistent and worldwide struggles over vital resources. Religious and political strife will not disappear in this scenario, but rather will be channeled into contests over valuable sources of water, food and energy. Prior to Reid's address, the most significant expression of this outlook was a report prepared for the U.S. Department of Defense by a California-based consulting firm in October 2003. Entitled "An Abrupt Climate Change Scenario and Its Implications for United States National Security," the report warned that global climate change is more likely to result in sudden, cataclysmic environmental events than a gradual (and therefore manageable) rise in average temperatures. Such events could include a substantial increase in global sea levels, intense storms and hurricanes and continent-wide "dust bowl" effects. This would trigger pitched battles between the survivors of these effects for access to food, water, habitable land and energy supplies."Violence and disruption stemming from the stresses created by abrupt changes in the climate pose a different type of threat to national security than we are accustomed to today," the 2003 report noted. "Military confrontation may be triggered by a desperate need for natural resources such as energy, food and water rather than by conflicts over ideology, religion or national honor." Until now, this mode of analysis has failed to command the attention of top American and British policymakers. For the most part, they insist that ideological and religious differences -- notably, the clash between values of tolerance and democracy on one hand and extremist forms of Islam on the other -- remain the main drivers of international conflict. But Reid's speech at Chatham House suggests that a major shift in strategic thinking may be under way. Environmental perils may soon dominate the world security agenda. This shift is due in part to the growing weight of evidence pointing to a significant human role in altering the planet's basic climate systems. Recent studies showing the rapid shrinkage of the polar ice caps, the accelerated melting of North American glaciers, the increased frequency of severe hurricanes and a number of other such effects all suggest that dramatic and potentially harmful changes to the global climate have begun to occur. More importantly, they conclude that human behavior -- most importantly, the burning of fossil fuels in factories, power plants, and motor vehicles -- is the most likely cause of these changes. This assessment may not have yet penetrated the White House and other bastions of head-in-the-sand thinking, but it is clearly gaining ground among scientists and thoughtful analysts around the world. For the most part, public discussion of global climate change has tended to describe its effects as an environmental problem -- as a threat to safe water, arable soil, temperate forests, certain species and so on. And, of course, climate change is a potent threat to the environment; in fact, the greatest threat imaginable. But viewing climate change as an environmental problem fails to do justice to the magnitude of the peril it poses. As Reid's speech and the 2003 Pentagon study make clear, the greatest danger posed by global climate change is not the degradation of ecosystems per se, but rather the disintegration of entire human societies, producing wholesale starvation, mass migrations and recurring conflict over resources. "As famine, disease, and weather-related disasters strike due to abrupt climate change," the Pentagon report notes, "many countries' needs will exceed their carrying capacity" -- that is, their ability to provide the minimum requirements for human survival. This "will create a sense of desperation, which is likely to lead to offensive aggression" against countries with a greater stock of vital resources. "Imagine eastern European countries, struggling to feed their populations with a falling supply of food, water, and energy, eyeing Russia, whose population is already in decline, for access to its grain, minerals, and energy supply." Similar scenarios will be replicated all across the planet, as those without the means to survival invade or migrate to those with greater abundance -- producing endless struggles between resource "haves" and "have-nots." It is this prospect, more than anything, that worries John Reid. In particular, he expressed concern over the inadequate capacity of poor and unstable countries to cope with the effects of climate change, and the resulting risk of state collapse, civil war and mass migration. "More than 300 million people in Africa currently lack access to safe water," he observed, and "climate change will worsen this dire situation" -- provoking more wars like Darfur. And even if these social disasters will occur primarily in the developing world, the wealthier countries will also be caught up in them, whether by participating in peacekeeping and humanitarian aid operations, by fending off unwanted migrants or by fighting for access to overseas supplies of food, oil, and minerals. When reading of these nightmarish scenarios, it is easy to conjure up images of desperate, starving people killing one another with knives, staves and clubs -- as was certainly often the case in the past, and could easily prove to be so again. But these scenarios also envision the use of more deadly weapons. "In this world of warring states," the 2003 Pentagon report predicted, "nuclear arms proliferation is inevitable." As oil and natural gas disappears, more and more countries will rely on nuclear power to meet their energy needs -- and this "will accelerate nuclear proliferation as countries develop enrichment and reprocessing capabilities to ensure their national security." Although speculative, these reports make one thing clear: when thinking about the calamitous effects of global climate change, we must emphasize its social and political consequences as much as its purely environmental effects. Drought, flooding and storms can kill us, and surely will -- but so will wars among the survivors of these catastrophes over what remains of food, water and shelter. As Reid's comments indicate, no society, however affluent, will escape involvement in these forms of conflict.

### Global warming leads to conflict in all major hotpots

McGinn 10 – Fellow in Strategic Studies @ Naval War College

Dennis McGinn, senior policy advisor to the American Council on Renewable Energy and is an international security senior fellow at the Rocky Mountain Institute, previously served as chairman of the U.S. Naval Institute Board of Directors, 12-1-2010, “ENERGY CHALLENGES; COMMITTEE: HOUSE SELECT ENERGY INDEPENDENCE AND GLOBAL WARMING,” CQ Congressional Testimony, Lexis

Last year, global climate researchers revised those predictions, now forecasting that the planet could warm by as much as 6.3 degrees Fahrenheit by the end of the century even if the world's leaders fulfill their most ambitious climate pledges, a much faster and broader scale pace of change than the IPCC forecast just two years ago. Their other findings include that sea level could rise by as much as six feet by 2100 instead of 1.5 feet, as the IPCC had projected, and the Arctic Sea may experience an ice-free summer by 2030, rather than by the end of the century. Let me give you some examples, from a military perspective, of what the future could be like if we fail to adequately address the causes and effects of climate change. In Africa, projected rising temperatures will dramatically reduce water availability, soil moisture, arable land and food production. Combined with increased extreme weather events - climate impacts will act to accelerate the destabilization of populations and governments already dealing with more traditional causes of conflict. Climate-driven crises are already happening there. Lack of water and changing agricultural patterns are at the root of crises in Darfur and Somalia, present day examples of failed social structures and governments, leading to widespread humanitarian crises, conflict, piracy and terrorism. In South and Central America - melting glaciers in Venezuela and the Peruvian Andes will directly impact water supplies and hydroelectric power. The Peruvian plains, northeast Brazil and Mexico will experience longer and more serious droughts. Land degradation and loss of food production will hit hard in Latin America - particularly Brazil whose economy is fueled by food exports - possibly leading to social disruptions and significant migration. We need only reflect on present immigration and security challenges along the U.S. southern border to get a glimpse of what the future could hold: immigration driven not by a search for a better economic life but in search of basic needs. In Bangladesh, the growing threat of more frequent and intense typhoons in the Bay of Bengal has the potential for wiping out essential coastal agriculture and fishing areas, just as it did in 1991 resulting in the U.S. military led Operation Sea Angel. Greater and more prolonged coastal typhoon damage would create an unprecedented humanitarian crisis, which could drive literally millions of refugees northwest toward India in search of relief. As the Himalayan glaciers recede, Asian nations like China, India and Pakistan will have to deal with internal and external unrest due to a much less reliable source of water from four great rivers --- creating floods at some times of the year, prolonged drought during others-- to meet the needs of growing populations. This past summer, we saw massive flooding in Pakistan that continues to affect more than twenty million people in a nuclear- armed nation, with an ongoing extremist insurgency that has direct bearing on the outcome of allied operations in Afghanistan. 40 percent of Asia's four billion people live within 45 miles of the coast - with coastlines and infrastructure that could be inundated by rising seas. Even the most modest projections of increased temperature and sea level rise include widespread flooding and loss of significant percentages of coastal delta farmland and heavily populated areas. In the Middle East, the vast majority of highly diverse populations already depend on water sources external to their borders. A greatly increased competition for diminishing supplies of water for agriculture and basic human needs would significantly ratchet up tensions in this historically critical and politically unstable region. These potential climate change effects will not just create crisis events happening far away from American soil or along our borders. Disasters like Hurricane Katrina in 2005 reveal, in a very stark way, how a natural disaster-caused humanitarian crisis can quickly lead to suffering, civil unrest and the need for a massive, expensive and sustained mobilization of resources. In fact today, more than five years after Hurricane Katrina produced widespread destruction along the Gulf Coast, thousands of people have not returned to their homes and hundreds of millions of dollars in damaged infrastructure remain. As CNA Military Advisory Board member Vice Admiral Richard Truly said climate change is not like "some hot spot we're trying to handle." "It's going to happen to **every country** and **every person** in the whole world at the same time." ii And while the effects of global warming create this potential environmental havoc, its principal dynamic will be to shift the world's balance of power and money.iii Drought and scant water supply have already fueled civil conflicts in global hot spots like Afghanistan, Nepal and Sudan, according to several new studies. The evidence is fairly clear that sharp downward deviations from normal rainfall in fragile societies **elevate the risk of major conflict**.iv Climate impacts like extreme drought, flooding, storm, temperatures, sea level rise, ocean acidification, and wildfires - occurring more frequently and more intensely across the globe - - will inevitably create political instability where societal demands for the essentials of life exceed the capacity of governments to cope. As noted above, fragile governments will become failed states, and desperation and hopelessness will drive whole populations to be displaced on a scale far beyond what we see today. And into this turmoil and power vacuum will rush paramilitaries, organized crime, extremists producing a highly exportable brand of terrorism.

### Global warming leads to nuclear war

Dyer 9 – PhD in ME History

Gwynne, MA in Military History and PhD in Middle Eastern History former @ [Senior Lecturer](file://localhost/wiki/Senior_Lecturer) in War Studies at the [Royal Military Academy Sandhurst](file://localhost/wiki/Royal_Military_Academy_Sandhurst), Climate Wars

THIS BOOK IS AN ATTEMPT, peering through a glass darkly, to understand the politics and the strategies of the potentially apocalyptic crisis that looks set to occupy most of the twenty­first century. There are now many books available that deal with the science of climate change and some that suggest pos­sible approaches to getting the problem under control, but there are few that venture very far into the grim detail of how real countries experiencing very different and, in some cases, overwhelming pressures as global warming proceeds, are likely to respond to the changes. Yet we all know that it's mostly politics, national and international, that will decide the outcomes. Two things in particular persuaded me that it was time to write this book. One was the realization that the first and most important impact of climate change on human civiliza­tion will bean acute and permanent crisis of food supply. Eating regularly is a non-negotiable activity, and countries that cannot feed their people are unlikely to be "reasonable" about it. Not all of them will be in what we used to call the "Third World" -the developing countries of Asia, Africa and Latin America. The other thing that finally got the donkey's attention was a dawning awareness that, in a number of the great pow­ers, climate change scenarios are already playing a large and increasing role in the military planning process. Rationally, you would expect this to be the case, because each country pays its professional military establishment to identify and counter "threats" to its security, but the implications of their scenarios are still alarming. There is a probability of wars, including even **nuclear wars**, if temperatures rise two to three degrees Celsius. Once that happens, all hope of international cooperation to curb emissions and stop the warming goes out the window.

## War – Arctic

### Warming Causes Middle East Wars over the artic – Wikileaks

Arsenault 11 reporter with Inter Press Service news agency. He has also reported for CBC radio, the Halifax Chronicle Herald and dozens of magazines. His work focuses on North and South America, geopolitics, energy markets and social movements. Educated in Canada, he holds a BA in history and economics from Dalhousie University and an MA in history (thesis pending) from the University of British Columbia, where he was awarded the 2008/09 Phil Lind Fellowship (Chris, Wikileaks: A Battle to carve up the artic, <http://english.aljazeera.net/profile/chris-arsenault.html>) AS

**It is considered the final frontier for oil and gas exploitation, and secret US embassy cables published by WikiLeaks confirm that nations are battling to "carve up" the Arctic's vast resources. "The twenty-first century will see a fight for resources**," Russian Ambassador to NATO Dmitry Rogozin was quoted as saying in a 2010 cable. "Russia should not be defeated in this fight." Along with exposing an estimated 22 per cent of the world's oil, ice melting due to global warming will open new shipping lanes, the arteries of global commerce, which nations are competing to control. And Russia certainly is not the only country eyeing the frozen prize. Per Stig Moller, then Danish foreign minister, mused in a 2009 cable that "new shipping routes and natural resource discoveries would eventually place the region at the centre of world politics". **Canada, the US, Russia, Norway, Denmark, and perhaps even China, have competing claims to the Arctic, a region about the size of Africa, comprising some six per cent of the Earth's surface. 'Resource wars'** "The WikiLeaks cables show us *realpolitik* in its rarest form," says Paul Wapner, director of the global environmental politics programme at American University in Washington. "**Diplomats continue to think of this as a zero sum world. When they see exploitable resources, all things being equal, they are going to approach them through a competitive nation state system**." The cables come to light at a time when academics and activists fear resource scarcity, particularly over dwindling oil and drinking water supplies, could lead to new international conflicts. Sir David King, the UK government's former chief scientific adviser, called the invasion of Iraq "the first of [this century's] resource wars", warning that "powerful nations will secure resources for their own people at the expense of others". In 2007, **Russia planted its flag 4,000 metres below the Arctic Ocean, in an attempt to claim that its continental shelf, the geological formation by which claims are measured, extends far into the frozen zone. "Behind Russia's policy are two potential benefits accruing from global warming**, the prospect for an [even seasonally] ice-free shipping route from Europe to Asia, and the estimated oil and gas wealth hidden beneath the Arctic sea floor," noted a 2009 cable articulating US beliefs. Presently, the Russians are far ahead of the US and other Arctic countries to take advantage of what will happen offshore, says Bruce Forbes, a research professor at the Arctic Centre at the University of Lapland in Finland. "The cables confirm what we as scientists already know; [global warming means] the Arctic is not just this hinterland, as it is portrayed in the mainstream media." In its 2010 Quadrennial Defence Review report, the Pentagon stated: "Climate change and energy are two issues that will play a significant role in shaping the future security environment." **Global warning If humans do not drastically reduce their fossil fuel consumption**, and current trends continue, the world is heading for a significant temperature increase, melting polar ice caps and causing sea levels to rise between 0.9 and 1.6 meters this century, according to a study from the Arctic Monitoring and Assessment Programme released in early May. The idea that global warming will melt polar icecaps and allow for new petroleum exploitation in the far north represents a terrible irony, says Andrea Harden-Donahue, a researcher with the Council of Canadians, a social justice organisation. "**Climate change is making these resources easier to exploit, while burning these resources will only contribute to more climate change,"** she says. "In Canada, we have seen a number of well-known actors, including BP and Chevron, exploring for oil and gas in the Beaufort Sea. In the US, Shell is consistently trying to get access to resources off the coast of Alaska; BP hopes to develop off the coast of Russia and Cairn energy have already been awarded licenses in Greenland and they are likely to start [drilling] this year. "**If [these companies] are allowed to move forward, I don't think it is unreasonable that we would see a scramble for these resources." A 2008 cable quotes Russian Navy head Admiral Vladimir Vysotsky as saying: "While in the Arctic there is peace and stability, however, one cannot exclude that in the future there will be a redistribution of power, up to armed intervention."** **Partisan politics** But verbose rhetoric about conflict could be linked to politicians who want to support the military-industrial complex and boost their own stature, rather than actual fears of impending violence, cables suggest. Norwegian Foreign Minister Jonas Gahr Stoere is referred to in a 2009 cable, describing "how, during his March 2009 visit to Moscow, he thanked [Russian Foreign Minister Sergei] Lavrov for making it so much easier for him to justify the Joint Strike Fighter purchase to the Norwegian public, given Russia's regular military flights up and down Norway's coast". Canadian politicians, including recently re-elected Conservative prime minister Stephen Harper, are also capitalising on fears of northern conflict to buttress narrow partisan agendas. Harper has made several high profile visits to the far north, boasting that: "From Afghanistan to the Arctic, from the coast of Somalia to the shores of Nootka Sound [on Vancouver island] we will be able to see what the bad guys are up to," with new military satellites. Commenting on Harper's rhetoric in a 2010 cable, US diplomats note that: "The persistent high public profile which this government has accorded 'Northern Issues' and the Arctic is, however, unprecedented and reflects the PM's views that 'the North has never been more important to our country' - although one could perhaps paraphrase to state 'the North has never been more important to our Party'." While politicians pound their chests over resource claims, Prof Forbes says the risk of actual conflict is minimal, because there are international institutions and treaties governing competing claims. **The Arctic Council, composed of eight Arctic nations, is the main discussion forum for issues related to the far north and the 1982 United Nations Convention on the Law of the Sea, which the US has not signed, is supposed to govern resource claims in the region**. During a meeting of the Arctic Council held on May 12 in Greenland, US secretary of state Hillary Clinton said that US ratification of the Law of the Sea Convention was "way overdue". Clinton's desire to change US policy to sign the convention may have more to do with resource battles than respect for international institutions. "If you stay out [of the convention]" then-Danish foreign minister Moller is quoted as saying in 2009 cables, "then the rest of us will have more to carve up in the Arctic". The US position of not ratifying the convention means it cannot put forward a formal claim to the seabed directly north of Alaska, says Oran Young, a professor of environmental science at the University of California. "If I knew why the US hasn't signed, I'd be happy," Young says, speculating that lobbyists for the mining industry and some senators who display "knee jerk negativism to the UN in general" were driving the decision. **'Doomsday scenario'** In a 1987 speech, Mikhail Gorbachev, leader of the former USSR, described the "threatening character" of NATO in the far north. Today, NATO's role in the Arctic is unclear. "There is no reason for NATO to have a strong Arctic profile," says Timo Koivurova, a visiting professor specialising in northern issues at the University of New South Wales in Australia. "All the Arctic Ocean coastal states have behaved exactly as the Law of the Sea dictates." But plenty of other people, from scholars to diplomats and military officials, do not entirely share Koivurova's optimistic view. "The *very* best case scenario [for peace in the arctic] is that we move beyond fossil fuels," says American University's Paul Wapner. "The best case scenario is that we have cooperative institutions - with representatives of indigenous people - who use peaceful and cooperative means to ensure fair access to these resources. **"The doomsday would be competitive resource wars. As climate change gets worse, people will be pushed to get more resources to run their air conditioners and so forth. My prediction is that we are still going to be addicted to oil [when the main icecaps melt] and these resources are going to be extracted by the most powerful lot - which would include Russia, the US and China."**

## AT: Warming Inevitable – Too Much Co2

### Not inevitable – cuts solve

Somerville 11 – Professor of Oceanography @ UCSD

Richard Somerville, Distinguished Professor Emeritus and Research Professor at Scripps Institution of Oceanography at the University of California, San Diego, Coordinating Lead Author in Working Group I for the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 3-8-2011, “CLIMATE SCIENCE AND EPA'S GREENHOUSE GAS REGULATIONS,” CQ Congressional Testimony, Lexis

Thus, atmospheric CO2 concentrations are already at levels predicted to lead to global warming of between 2.0 and 2.4C. The conclusion from both the IPCC and subsequent analyses is blunt and stark - **immediate and dramatic emission reductions** of all greenhouse gases are urgently needed if the 2 deg C (or 3.6 deg F) limit is to be respected. This scientific conclusion illustrates a key point, which is that it will be governments that will decide, by actions or inactions, what level of climate change they regard as tolerable. This choice by governments may be affected by risk tolerance, priorities, economics, and other considerations, but in the end it is a choice that humanity as a whole, acting through national governments, will make. Science and scientists will not and should not make that choice. After governments have set a tolerable limit of climate change, however, climate science can then provide valuable information about what steps will be required to keep climate change within that limit.

### Not inevitable – even if temporarily over the tipping point, can be brought back down

Dyer 9 – PhD in ME History

Gwynne, MA in Military History and PhD in Middle Eastern History former @ [Senior Lecturer](file://localhost/wiki/Senior_Lecturer) in War Studies at the [Royal Military Academy Sandhurst](file://localhost/wiki/Royal_Military_Academy_Sandhurst), Climate Wars

There is no need to despair. The slow-feedback effects take a long time to work their way through the climate system, and if we could manage to get the carbon dioxide concentration back down to a safe level before they have run their course, they might be stopped in their tracks. As Hansen et al. put it in their paper: A point of no return **can be avoided**, even if the tipping level [which puts us on course for an ice-free world] is **temporarily exceeded**. Ocean and ice-sheet inertia permit overshoot, provided the [concentration of carbon dioxide] is returned below the tipping level before initiating irre­versible dynamic change .... However, if overshoot is in place for centuries, the thermal perturbation will so pen­etrate the ocean that recovery without dramatic effects, such as ice-sheet disintegration, becomes unlikely. The real, long-term target is 350 parts per million or lower, if we want the Holocene to last into the indefinite future, but for the remainder of this book I am going to revert to the 450 parts per million ceiling that has become common currency among most of those who are involved in climate change issues. If we manage to stop the rise in the carbon dioxide concentration at or not far beyond that figure, then we must **immediately begin** the equally urgent and arduous task of getting it back down to a much lower level that is safe for the long term, but one step at a time will have to suffice. I suspect that few now alive will see the day when we seriously start work on bringing the concen­tration back down to 350, so let us focus here on how to stop it rising past 450.

## AT: So2 Screw

### Dimming particulates decreasing now

Westerly Sun 10

Earth Talk, 12-2010, “Global dimming a result of pollution,” http://www.thewesterlysun.com/news/article\_f919852a-039e-11e0-8702-001cc4c03286.html

Columbia University climatologist Beate Liepert notes a reduction by some 4 percent of the amount of solar radiation reaching the Earth's surface between 1961 and 1990, a time when particulate emissions began to skyrocket around the world. But a 2007 study by the National Aeronautics and Space Administration found an **overall reversal of global dimming** since 1990, probably due to stricter pollution standards adopted by the U.S. and Europe around that time.

### Warming outweighs dimming

Reynolds 10 – PhD in Atmospheric Sciences

Michael, PhD in Atmospheric Sciences, “Report from the On-board Scientist: Aerosols, Volcanoes and Global Dimming,” http://www.aroundtheamericas.org/log/report-from-the-on-board-scientist-aerosols-volcanoes-and-global-dimming/

On the other hand, aerosols can add heat to the atmosphere which partially offsets the cooling effect. As the Earth heats up from the sun, it radiates heat back to space. Aerosols absorb some of the heat radiation and reduce the amount of heat radiation escaping out to space. This is the same heat-blocking effect attributed to greenhouse gasses, and in this way aerosols can have a heating effect on global climate. Nevertheless, the net effect of aerosols is to reduce the rate of global warming from greenhouse gasses. Does this mean we should all go build fires and drive our cars? No, because the offset that aerosols make on all of all these activities is **smaller than the impact those activities make on global warming**. Models and data now show that aerosols reduce the increase in global temperature by a factor of approximately 50% (there is uncertainty in the actual amount). So, they slow down the process but do not stop it. And they create pollution and effect health at the same time.

## AT: Co2 Ag – Control Uniqueness

### We control uniqueness – ag collapsing now

Gillis 11

Justin Gillis, Editor @ NYT, 6-11-2011, “A Warming Planet Struggles to Feed Itself,” Factiva

Sitting with a group of his fellow wheat farmers, Francisco Javier Ramos Bours voiced a suspicion. Water shortages had already arrived in recent years for growers in his region, the Yaqui Valley, which sits in the Sonoran Desert of northwestern Mexico. In his view, global climate change could well be responsible. “All the world is talking about it,” Mr. Ramos said as the other farmers nodded. Farmers everywhere face rising difficulties: **water shortages as well as flash floods**. Their **crops are afflicted** by emerging pests and diseases and by blasts of heat beyond anything they remember. In a recent interview on the far side of the world, in northeastern India, a rice farmer named Ram Khatri Yadav offered his own complaint about the changing climate. “It will not rain in the rainy season, but it will rain in the nonrainy season,” he said. “The cold season is also shrinking.”

## AT: Co2 Ag – Doesn’t Solve

### Co2 doesn’t boost yields – any evidence of growth is short-term and hypothetical

Jackson 9 – Research molecular biologist @ USDA

Eric, 2009, “The international food system and the climate crisis,” The Panama News, Lexis

A major weakness in the forecasts of the IPCC and others when it comes to agriculture is that their predictions accept a theory of “carbon fertilization,” which argues that higher levels CO2 in the atmosphere will enhance photosynthesis in many key crops, and boost their yields. Recent studies show **that this is a mirage.** Not only does any initial acceleration in growth slow down significantly after a few days or weeks, but the increase in CO2 reduces nitrogen and protein in the leaves by more than 12 percent. This means that, with climate change, there will be less protein for humans in major cereals such as wheat and rice. There will also be less nitrogen in the leaves for bugs, which means that bugs will eat more leaf, leading to important reductions in yield.

### Warming leads to weather disasters – this is comparatively worse for agriculture than the benefits of co2 fertilization

-top ag experts agree

Gillis 11

Justin Gillis, Editor @ NYT, 6-11-2011, “A Warming Planet Struggles to Feed Itself,” Factiva

Now, the latest scientific research suggests that a previously discounted factor is helping to destabilize the food system: climate change. Many of the failed harvests of the past decade were a consequence of weather disasters, like floods in the United States, drought in Australia and blistering heat waves in Europe and Russia. Scientists believe some, though not all, of those events were caused or worsened by human-induced global warming. Temperatures are rising rapidly during the growing season in some of the most important agricultural countries, and a paper published several weeks ago found that this had shaved **several percentage points off potential yields**, adding to the price gyrations. For nearly two decades, scientists had predicted that climate change would be relatively manageable for agriculture, suggesting that even under worst-case assumptions, it would probably take until 2080 for food prices to double. In part, they were counting on a counterintuitive ace in the hole: that rising carbon dioxide levels, the primary contributor to global warming, would act as a powerful plant fertilizer and offset many of the ill effects of climate change. Until a few years ago, these assumptions went largely unchallenged. But lately, the destabilization of the food system and the soaring prices have **rattled many leading scientists**. “The success of agriculture has been astounding,” said Cynthia Rosenzweig, a researcher at NASA who helped pioneer the study of climate change and agriculture. “But I think there’s starting to be premonitions that it may not continue forever.” A scramble is on to figure out whether climate science has been too sanguine about the risks. Some researchers, analyzing computer forecasts that are used to advise governments on future crop prospects, are pointing out what they consider to be gaping holes. These include a failure to consider the effects of extreme weather, like the floods and the heat waves that are increasing as the earth warms. A rising unease about the future of the world’s food supply came through during interviews this year with more than 50 agricultural experts working in nine countries.

## AT: Co2 Ag – No Yield Increase

### Turn – pollution leads to ozone – tanks ag – outweighs any benefit from CO2

Monbiot 7 – Professor @ Oxford

George, Professor @ Oxford Brookes University, Heat: How to Stop the Planet from Burning, pg. 7

But now, I am sorry to say, it seems that I might have been right, though for the wrong reasons. In late 2005, a study published in the Philosophical Transactions of the Royal Society alleged that the yield predictions for temperate countries were 'over optimistic'. The authors had blown carbon dioxide and ozone, in concentrations roughly equivalent to those expected later this century, over crops in the open air. They discovered that the plants didn't respond as they were supposed to: the extra carbon dioxide did not fertilize them as much as the researchers predicted, and the **ozone reduced their yields** by 20 per cent." Ozone levels are rising in the rich nations by between 1 and 2 per cent a year, as a result of sunlight interacting with pollution from cars, planes and power stations. The levels happen to be highest in the places where crop yields were expected to rise: western Europe, the midwest and eastern US and eastern China. The expected ozone increase in China will cause maize, rice and soybean production to fall by over 30 per cent by 2020, These reductions in yield, if real, arc enough to **cancel out the effects** of both higher temperatures and higher carbon dioxide concentrations.

### Turn – pollution leads to decay – tanks ag and turns their benefit

Pearce 7 – Published author and environmental consultant

Fred, With Speed and Violence, published author and environmental consultant, pg. 75

First, the extra carbon dioxide in the atmosphere encourages photosynthesis to speed up. So plants grow faster and absorb more carbon dioxide. But that extra carbon dioxide is also warming the climate. And the warming encourages the processes that break down plant material and release carbon dioxide back into the air. Because it takes a couple of decades for the extra carbon dioxide to bring about warmer temperatures, we have seen the fertilization effect first. Now the process of **decay is starting to catch up**. The processes do not involve plants alone. Soils have their own processes of inhaling and exhaling carbon. And they, too, will switch from being a net sink to a net source—eventually releasing what carbon they have absorbed in recent decades. Ultimately, "you can't have the one without the other," Cox says. "If you breathe in, eventually you have to breathe out." And soon, most of the rainforests and soils of the world will be breathing out, pouring their stored carbon back into the air. If the climate gees drier and more fires occur, then the release of the carbon dioxide will happen even more quickly. But it will happen anyway.

### Turn – weeds – Co2 leads to weeds – tanks agriculture

Ziska 7 – PhD in Agriculture

Lewis Ziska, PhD, Principal investigator at United States Department of Agriculture  
Agricultural Research Service Alternate Crop and Systems Lab. “Climate change impact on weeds” http://www.climateandfarming.org/pdfs/FactSheets/III.1Weeds.pdf

Weeds have a greater genetic diversity than crops. Consequently, if a resource (light, water, nutrients or carbon dioxide) changes within the environment, it is more likely that weeds will show a greater growth and reproductive response. It can be argued that many weed species have the C4 photosynthetic pathway and therefore will show a smaller response to atmospheric CO2 relative to C3 crops. However, this argument does not consider the range of available C3 and C4 weeds present in any agronomic environment. That is, at present, the U.S. has a total of 46 major crops; but, over 410 “troublesome” weed species (both C3 and C4) associated with those crops (Bridges 1992). Hence, if a C4 weed species does not respond, it is likely that a C3 weed species will. In addition, many growers recognize that the worst weeds for a given crop are similar in growth habit or photosynthetic pathway; indeed, they are often the same uncultivated or “wild” species, e.g. oat and wild oat, sorghum and shattercane, rice and red rice. To date, for all weed/crop competition studies where the photosynthetic pathway is the same, weed growth is favored as CO2 is increased (Table 1, Ziska and Runion, In Press). In addition to agronomic weeds, there is an additional category of plants that are considered “noxious” or “invasive” weeds. These are plants, usually non-native whose introduction results in wide-spread economic or environmental consequences (e.g. kudzu). Many of these weeds reproduce by vegetative means (roots, stolons, etc.) and recent evidence indicates that as a group, these weeds may show a strong response to recent increases in atmospheric CO2 (Ziska and George 2004). How rising CO2 would contribute to the success of these weeds in situ however, is still unclear. Overall, the data that are available on the response of weeds and changes in weed ecology are limited. Additional details, particularly with respect to interactions with other environmental variables (e.g. nutrient availability, precipitation and temperature) are also needed.

### Co2 fertilization only works in extremely precise circumstances – warming makes those impossible

Wolfe 7 – Professor of Horticulture

David Wolfe, Professor of Horticulture at Cornell University, NY. “Climate Change Impact on Northeast Agriculture” http://www.climateandfarming.org/pdfs/FactSheets/Impacts.pdf

Carbon dioxide, in addition to being a greenhouse gas, can also directly affect Earth’s plant life because plants take up CO2 during photosynthesis to produce sugars for growth. The magnitude of the “CO2 fertilization effect” varies tremendously among plant species and from variety to variety (Wolfe 1994). Plants with the so-called “C-3” photosynthetic pathway, which includes most NE crop species (with the notable exception of corn) and many weed species, can show productivity increases of 20 to 30% or more when grown at twice current CO2 levels and at optimal conditions. Attaining maximum CO2 benefits often requires more fertilizer (to support bigger plants), optimum temperatures, unrestricted root growth, and excellent control of weeds, insects, and disease. High CO2 can have another direct effect on plants- reducing transpiration (water loss) per unit leaf area by causing partial closure of leaf stomates (the small openings on the leaf surface). However, often this water conserving response is minimized or not observed at the whole-plant or field (ET) level because high CO2-grown plants have more total leaf (transpirational surface) area. In general, the CO2 fertilization effect **cannot compensate** for negative effects from **other environmental stresses** (Luo and Mooney 1999). For example, multi-year field and greenhouse studies with potato and dry bean conducted at Ithaca, NY showed significant yield increases for both potatoes and beans at twice current CO2 levels when daytime maximum temperatures did not exceed 80 F, but when maximum temperatures were allowed to occasionally reach 95 F during tuber or pod formation, there was no yield benefit from higher CO2 (Peet and Wolfe 2000; Jifon and Wolfe 2005). Similarly, Mitchell et al. (1993) observed significant increases in winter wheat yields from a CO2 doubling at optimum temperature, but high CO2 did not make up for yield losses when plants were grown at high temperatures that cause stress and a shortening of the grain filling period.

## AT: Co2 Ag – No Yield Increase – Lab Conditions

### Co2 fertilization is a myth – prefer our evidence – newest and assumes real world conditions

Gillis 11

Justin Gillis, Editor @ NYT, 6-11-2011, “A Warming Planet Struggles to Feed Itself,” Factiva

For decades, scientists believed that the human dependence on fossil fuels, for all the problems it was expected to cause, would offer one enormous benefit. Carbon dioxide, the main gas released by combustion, is also the primary fuel for the growth of plants. They draw it out of the air and, using the energy from sunlight, convert the carbon into energy-dense compounds like glucose. All human and animal life runs on these compounds. Humans have already raised the level of carbon dioxide in the atmosphere by 40 percent since the Industrial Revolution, and are on course to double or triple it over the coming century. Studies have long suggested that the extra gas would supercharge the world’s food crops, and might be especially helpful in years when the weather is difficult. But many of those studies were **done in artificial conditions**, like greenhouses or special growth chambers. For the past decade, scientists at the University of Illinois have been putting the “CO2 fertilization effect” to a real-world test in the two most important crops grown in the United States. They started by planting soybeans in a field, then sprayed extra carbon dioxide from a giant tank. Based on the earlier research, they hoped the gas might bump yields as much as 30 percent under optimal growing conditions. But when they harvested their soybeans, they got a rude surprise: the bump was only half as large. “When we measured the yields, it was like, wait a minute — this is not what we expected,” said Elizabeth A. Ainsworth, a Department of Agriculture researcher who played a leading role in the work. When they grew the soybeans in the sort of conditions expected to prevail in a future climate, with high temperatures or low water, the extra carbon dioxide **could not** fully **offset the yield decline** caused by those factors. They also ran tests using corn, America’s single most valuable crop and the basis for its meat production and its biofuel industry. While that crop was already known to be less responsive to carbon dioxide, a yield bump was still expected — especially during droughts. The Illinois **researchers got no bump.** Their work has contributed to a broader body of research suggesting that extra carbon dioxide does act as plant fertilizer, but that the benefits are less than previously believed — and probably **less than needed to avert food shortages**. “One of the things that we’re starting to believe is that the positives of CO2 are **unlikely to outweigh the negatives of the other factors**,” said Andrew D. B. Leakey, another of the Illinois researchers.

## AT: Co2 Ag – Warming Outweighs

### Warming tanks ag – outweighs fertilization effect

Stern 6 – Professor of Economics

 Sir Nicholas Stern, Head of the Government Economic Service and Adviser to the Government on the economics of climate change and development, 10/30/06. "Stern Review on the economics of climate change, [http://www](http://www/" \t "_blank).

treasury.gov.uk/independent\_reviews/stern\_review\_economics\_climate\_change/stern\_review\_report.cfm

Carbon dioxide is a basic building block for crop growth. Rising concentrations in the atmosphere will have benefits on agriculture – both by stimulating photosynthesis and decreasing water requirements (by adjusting the size of the pores in the leaves). But the extent to which crops respond depends on their physiology and other prevailing conditions (water availability, nutrient availability, pests and diseases). Until recently, research suggested that the positive benefits of increasing carbon dioxide concentrations might compensate for the negative effects of rising mean temperatures (namely shorter growing season and reduced yields). Most crop models have been based on hundreds of experiments in greenhouses and field-chambers dating back decades, which suggest that crop yields will increase by 20 – 30% at 550 ppm carbon dioxide. Even maize, which uses a different system for photosynthesis and does not respond to the direct effects of carbon dioxide, shows increases of 18 – 25% in greenhouse conditions due to improved efficiency of water use. But new analysis by Long et al. (2006) showed that the high-end estimates were largely based on studies of crops grown in greenhouses or field chambers, whereas analysis of studies of crops grown in near-field conditions suggest that the benefits of carbon dioxide may be significantly less – an 8 – 15% increase in yield for a doubling of carbon dioxide for responsive species (wheat, rice, soybean) and no significant increase for non-responsive species (maize, sorghum). These new findings may have very significant consequences for current predictions about impacts of climate change on agriculture. Parry et al. (2004) examined the impacts of increasing global temperatures on cereal production and found that **significant global declines** in productivity could occur if the carbon fertilisation is small (figures below). Regardless of the strength of the carbon fertilisation effect, higher temperatures are likely to become increasingly damaging to crops, as droughts intensify and **critical temperature thresholds** **for crop production** are reached **more often.**

### Warming outweighs

Lynas 7 – Associate @ Oxford’s School of the environment

Mark, advisor on climate change to the President of the Maldives, Educational focus on Politics and History, Six Degrees, pg. 197

It is plausible that new areas of production in subpolar regions of Canada and Russia will be able to cover some of the shortage, though warmer temperatures across thawed tundra do not equate to higher rainfall or decent soils. It is also likely that new technological developments, with more drought-resistant crop strains, could help to stave off disaster for a while, as could the fertilization effect of higher CO2 levels in the air. But **none of this can** **make up for the loss** of most of the planet's key agricultural areas, and it is difficult to avoid the conclusion that mass starvation will be a permanent danger for much of the human race in the four-degree world—and possibly, as suggested previously, much earlier. With major global breadbaskets dusty and abandoned, rising demand will be chasing rapidly diminishing supply. How this food crisis might play out in different areas is impossible to predict. History, however, is littered with the ruins of societies that collapsed once their environments became overstretched and their food supplies endangered. The case of the Mayans is one of the better known, but in China, too, early civilizations rose and fell in response to fluctuations in rainfall and drought. In modern-day Pakistan, the ancient Harappan civilization of the Indus River Valley was likely extinguished by a particularly severe drought 4,200 years ago.

### Here’s comparative evidence that warming + fertilization is net-negative

-these are optimistic assessments

Cline 7 – Fellow @ Peterson

William, senior fellow jointly at the Peterson Institute for International Economics and the Center for Global Development in Washington, 2007, “Global Warming Losers,” The International Economy, Lexis

A key decision in such estimates is how much benefit to allow for “carbon fertilization.” Recent open-air experiments have shown only about half as much yield gain as earlier laboratory experiments. My estimates allow for a weighted-average 15 percent yield increase from the doubling of carbon dioxide in the atmosphere from today’s levels by the 2080s (to 735 parts per million). My estimates take the average of the results obtained by applying the crop models and the Ricardian models to the detailed geographical estimates of climate change by the 2080s. Aggregate world agricultural productivity would decline by an estimated 16 percent from baseline levels, if carbon fertilization is omitted, and by **3 percent if it is included** (Table 1). Both sets of estimates are probably on the optimistic side, because they do not take account of losses due to increased pests or increased incidence of extreme weather events (including floods and drought). The Ricardian estimates implicitly assume that more water will be available for irrigation whereas in some regions (notably Africa) greater water scarcity is likely

### Prefer our evidence – models understate warming and overstate the benefit of carbon fertilization

Cline 7 – Fellow @ Peterson

William, senior fellow jointly at the Peterson Institute for International Economics and the Center for Global Development in Washington, 2007, “Global Warming Losers,” The International Economy, Lexis

The primary implication of these findings is that it would be a serious mistake to view agricultural effects of global warming as broadly benign. Some estimates, which use Ricardian models similar to those I applied, have suggested that by late in this century world agriculture could actually still be benefiting rather than experiencing losses from global warming. Close examination reveals that such estimates have tended to **understate the extent** of prospective warming and **overstate the extent** of carbon fertilization gains. It is also crucial to keep in mind that there is a lag of about thirty years between today’s emissions and the time when the full extent of the resulting global warming arrives (“ocean thermal lag” associated with an initial period in which the deep ocean warms to reestablish equilibrium differential with surface temperatures). Indeed, my estimates are just a snapshot in time, and losses would be expected to **grow more severe** by early in the next century

## Warming Undercuts Any Benefit

### Warming tanks pollination – prevents any benefit

Brown 8 – Professor @ CAS

Lester E. Brown, Director and Founder of the global institute of Environment in the U.S., “Plan B 3.0: Mobilizing to Save Civilization,” Factiva

Agriculture as it exists today has been shaped by a climate system that has changed little over farming’s 11,000-year history. Crops were developed to maximize yields in this long-standing climatic regime. As the temperature rises, agriculture will be increasingly out of sync with its natural environment. Nowhere is this more evident than in the relationship between temperature and crop yields. Since crops in many countries are grown at or near their thermal optimum, even a relatively minor increase during the growing season of 1 or 2 degrees Celsius can shrink the grain harvest in major food-producing regions, such as the North China Plain, the Gangetic Plain of India, and the U.S. CornBelt. Higher temperatures can reduce or even halt photosynthesis, prevent pollination, and lead to crop dehydration. Although the elevated concentrations of atmospheric CO2 that raise temperature can also raise crop yields, the detrimental effect of higher temperatures on yields overrides the CO2 fertilization effect for the major crops. In a study of local ecosystem sustainability, Mohan Wali and his colleagues at Ohio State University noted that as temperature rises, photosynthetic activity in plants increases until the temperature reaches 20 degrees Celsius (68 degrees Fahrenheit).The rate of photosynthesis then plateaus until the temperature hits 35 degrees Celsius (95 degrees Fahrenheit), whereupon it begins to decline, until at 40 degrees Celsius (104 degrees Fahrenheit), photosynthesis ceases entirely.17The most vulnerable part of a plant’s life cycle is the pollination period. Of the world’s three food staples—rice, wheat, and corn—corn is particularly vulnerable. In order for corn to reproduce, pollen must fall from the tassel to the strands of silk that emerge from the end of each ear of corn. Each of these silk strands is attached to a kernel site on the cob. If the kernel is to develop, a grain of pollen must fall on the silk strand and then journey to the kernel site. When temperatures are uncommonly high, the silk strands quickly dry out and turn brown, unable to play their role in the fertilization process. The effects of temperature on rice pollination have been studied in detail in the Philippines. Scientists there report that the pollination of rice falls from 100 percent at 34 degrees Celsius to near zero at 40 degrees Celsius, leading to crop failure.

### Warming tanks any benefit of fertilization

Stern 7 – Chair of the London School of Economics and Poli Sci

Nicholas- Head of the British Government Economic Service, Former Head Economist for the World Bank, I.G. Patel Chair at the London School of Economics and Political Science, “The Economics of Climate Change: The Stern Review”, The report of a team commissioned by the British Government to study the economics of climate change led by Siobhan Peters, Head of G8 and International Climate Change Policy Unit, Cambridge University Press

Food production will be particularly sensitive to climate change, because crop yields depend in large part on prevailing climate conditions (temperature and rainfall patterns). Agriculture currently accounts for 24% of world output, employs 22% of the global population, and occupies 40% of the land area. 75% of the poorest people in the world (the one billion people who live on less than $1 a day) live in rural areas and rely on agriculture for their livelihood.29 Low levels of warming in mid to high latitudes (US, Europe, Australia, Siberia and some parts of China) may improve the conditions for crop growth by extending the growing season30 and/or opening up new areas for agriculture. Further warming will have increasingly negative impacts – the classic “hill function” (refer back to Box 3.1) - as damaging temperature thresholds are reached more often and water shortages limit growth in regions such as Southern Europe and Western USA.31 High temperature episodes can reduce yields by up to half if they coincide with a critical phase in the crop cycle like flowering (Figure 3.4).32 The impacts of climate change on agriculture depend crucially on the size of the “carbon fertilisation” effect (Box 3.4). Carbon dioxide is a basic building block for plant growth. Rising concentrations in the atmosphere may enhance the initial benefits of warming and even offset reductions in yield due to heat and water stress. Work based on the original predictions for the carbon fertilisation effect suggests that yields of several cereals (wheat and rice in particular) will increase for 2 or 3°C of warming globally, according to some models, but then start to fall once temperatures reach 3 or 4°C.33 Maize shows greater declines in yield with rising temperatures because its different physiology makes it less responsive to the direct effects of rising carbon dioxide. Correspondingly, world cereal production only falls marginally (1 – 2%) for warming up to 4°C (Box 3.4).34 But the latest analysis from crops grown in more realistic field conditions suggests that the effect is likely to be no more than half that typically included in crop models.35 When a weak carbon fertilisation effect is used, worldwide cereal production declines by 5% for a 2°C rise in temperature and 10% for a 4°C rise. By 4°C, entire regions may be too hot and dry to grow crops, including parts of Australia. Agricultural collapse across large areas of the world is possible at even higher temperatures (5 or 6°C) but clear empirical evidence is still limited.

### Increased CO2 kills soil and causes droughts – net decrease in agriculture

**Hardy 2K3 –** Chair department of environmental sciences (page 86, Climate Change: Causes, Effects, Solutions, Wiley – AS)

Greenhouse **warming**, in some areas, **will lead to higher surface air temperatures, greater evapoirunspuation. Power soil moisture, and increasingly frequent droughts**. A ‘drought index.’ based on the atmospheric supply of moisture minus the atmospheric demand for moisture. Can be used together with climate model **Outputs of precipitation and potential evapotranspiration to evaluate the probable occurrence of droughts. Summer droughts will become increasingly frequent at low latitudes** and Less frequent at high-latitude areas such a,. Canada and Siberia. Soil moisture is often the moist important factor controlling plant growth and agriculture production. Globally, models predict significant soil moisture changes with dccreases in sorne regions and increases in o(hers (Plate 6). Large reductions in summer soil moisture will occur many regions of mid to high latitudes. for ewnple. the North American Great Plains. Western Europe. Northern Canada. and Siberia. For example, researchers at the University of Delaware examined the entices of a doubling of CO on soil moisture at 12 selected of the globe. They applied two global climate to the climatic water budget onacuursegndof8xlOoi-4x5degrees latitude by longitude arid calculated the soil moisture index. where P = precipitation. Pi = potential evap transpiration (based on field capacity of the soil and air temperatures f. Their results for the region of North America covering Southeastern Texas and Northern Mexico indicate that, under changed conditions, the months of may through September will experience no more than Some of precipitation and that peak summer evapotranspiration will increase by 27g’ Of the 12 global regions examined, they predict an increase in PE in all regions. Because of low tempera tures. the warming would have little influence on evapotranspiration in winter at higher latitudes. Precipitation would increase over all. hut the additional water will he less than the loss due to evontranspirationion. Therefore. The annual water deficit would increase in all regions except south central Canada (NOAA model) and the Ukraine (GISS model). In 7 of 12 areas, both models agree on a shift to drier conditions, most niarkedly in the upper Midwest of the United States. the Texas-Mexico area, and Brazil Overall they conclude that water demand will increase more than precipitation and most regions will experience an increase in annual water deficit, **a decrease in annual water surplus, and a decrease in summer soil moisture storage. They predict changes of species in about two-thirds of the 12 regions studied, the horizons being the Pacific Northwest. the Ukraine, and West Centrai Africa. Finally, greenhouse warning will lead to greater heating in the eastern tropical Pacific than in the western tropical Pacific, that is. an intensification of the El Nino pattern This will increase the intensity of future droughts in the Australian region.**

### Elevated Co2 Levels kill plant levels in large regions by killing carbon composition levels

**Shaw 02 -** 1Department of Global Ecology, Carnegie Institution of Washington (Grassland Responses to Global Environmental Changes Suppressed by Elevated CO2, page 1987, Volume 298) AS

**Simulated global changes, including warming, increased precipitation, and nitrogen deposition,** alone and in concert, increased net primary production (NPP) in the third year of ecosystem-scale manipulations in a California annual grassland**.** Elevated carbon dioxide also increased NPP, but only as a singlefactor treatment. Across all multifactor manipulations, elevated carbon dioxide suppressed root allocation, decreasing the positive effects of increased temperature, precipitation, and nitrogen deposition on NPP. The NPP responses to interacting global changes differed greatly from simple combinations of singlefactor responses. These findings indicate the importance of a multifactor experimental approach to understanding ecosystem responses to global change. Human actions are affecting many aspects of the Earth system. The composition of the atmosphere, the climate, the abundance of invasive species, and the area of managed landscapes have all undergone important changes in the past century. These changes are likely to be even greater in this century (*1*)*.* In almost any setting, realistic global change is decidedly multifactorial. Warming, increased precipitation, increased deposition of N-containing compounds, and increased atmospheric CO2 are all likely consequences of CO2 emissions from fossil fuel combustion and land use change (*2*)*.* In the past century, atmospheric CO2 concentration has increased globally by more than 30% (*2*)*.* **Temperature, precipitation, and deposition of biologically available N have increased for large regions (*3*–*5*). Further increases in the future are almost certain**. Most of the experimental research on ecosystem responses to global change has addressed responses to single global changes, with relatively few studies exploring responses to two or more interacting treatments (*6*–*8*). Experimental manipulations of both temperature and CO2 concentration are rare at the ecosystem scale (*9*, *10*), even though elevated CO2 is a primary driver of climate change (*2*). Several modeling studies have addressed ecosystem responses to multifactor global changes (*11*, *12*)*,* but the theoretical foundation for predicting ecosystem responses to simultaneous changes in multiple factors is incomplete. For some processes (such as photosynthesis), well-tested mechanistic models support the simulation and interpretation of multifactor responses (*13*). For many other processes, however, including biomass allocation, the timing of seasonal activity, and species replacements, the empirical data are too sparse to support credible models or allow comprehensive hypothesis tests. Both empirical and modeling studies highlight potential contrasts in responses to single global changes and multiple, interacting global changes. Stimulation of plant growth by elevated CO2, for example, may be strongest when water is limiting (*14*), when nutrients are abundant (*15*), or when plant species diversity is high (*6*). Simulated ecosystem responses to future global changes depend strongly on such interactions. In many settings, simulated warming increases decomposition more than net primary production (NPP), leading to a loss of carbon (*16*). In others, elevated CO2 and N deposition tend to increase NPP more than decomposition, leading to carbon storage. **In some simulations, the responses of carbon storage to the three factors nearly cancel one another out.** In others, changes combine in nonadditive ways, with examples of both suppression and amplification (*11*). One of the keys to understanding the long-term impacts of multiple global changes on ecosystem function will be experiments on model ecosystems that are amenable to factorial manipulations and respond rapidly. **Annual grassland, with a high diversity of small short-lived plants, is an attractive model system for global change experiments.**

## AT: Co2 Ag – Prefer Our Evidence

### Their evidence is too optimistic

Gillis 11

Justin Gillis, Editor @ NYT, 6-11-2011, “A Warming Planet Struggles to Feed Itself,” Factiva

Other recent evidence suggests that longstanding assumptions about food production on a warming planet may have been too optimistic. Two economists, Wolfram Schlenker of Columbia University and Michael J. Roberts of North Carolina State University, have pioneered ways to compare crop yields and natural temperature variability at a fine scale. Their work shows that when crops are subjected to temperatures above a certain threshold — about 84 degrees for corn and 86 degrees for soybeans — **yields fall sharply**.

## AT: Ice Age – Comparative Answer

### Global warming is faster and comparatively worse

-an ice age won’t start mass ice production for hundreds of thousands of years

Chameides 8 – Professor of Environment @ Duke

Bill Chameides, PhD, Yale University, “Pulse of the Planet: A New Ice Age IS Coming ... but Don't Hold Your Breath,” 11-17-2008, http://www.nicholas.duke.edu/thegreengrok/iceage-nature

Skeptics have been arguing that we should forget about global warming -- a new ice age is imminent. Maybe, some say, it's already started. In fact, a new study does predict the coming of an ice age, one promising to be more permanent than others. Is it imminent? Depends on how you characterize 10,000 years. It may surprise you to know that in our current climate, ice ages are more the norm than not. Over the past three million years, covering the end of the Pliocene and the present Pleistocene epoch, the Earth’s climate has oscillated between cold times (called ice ages or glaciations) and warmer times, interglaciations. In the recent past (the last one million years or so) the ice ages have lasted for about 100,000 years, and the warmer periods tens of thousands of years. The last ice age ended about 12,000 years ago. The questions most relevant to us are: when will the next ice age occur and should we be concerned about a global cold wave or the current global warming? The answers lie in the mechanism behind the climate swings. The oscillations between ice ages and warm periods can be qualitatively explained by the Milankovitch theory (for more details see here). The theory's basic tenet is that the ice age–interglacial swings are triggered by changes in the Earth’s orbit about the sun (eccentricity), rotational changes of the Earth on its axis (precession), and changes in the tilt of the axis (obliquity, which is what causes the seasons). The orbital changes affect how much sunlight reaches the Earth at different latitudes. These changes in solar radiation are then amplified by feedbacks involving carbon dioxide and other greenhouse gases, the ice albedo, and the large temperature swings inferred between ice ages and interglacials. One of the major puzzles in the Milankovitch theory is the so-called Mid-Pleistocene transition. Before about one million years ago, the glacial periods lasted about 40,000 years (which corresponds to the frequency of obliquity changes). Then the glaciations transitioned to a 100,000-year cycle (which corresponds to the frequency of changes in eccentricity). Why this transition? Scientists continue to discuss the cause. Now Tom Crowley of the University of Edinburgh (previously at Duke University) and William Hyde of the University of Toronto have added a new wrinkle to the debate in a paper just published in Nature. Using a simplified, coupled climate-ice sheet model, they conclude that the shift in the ice age cycling kicked off a slow transition to a new climate regime, one that will be characterized by a permanent ice sheet in the northern mid-latitudes. They argue that this transition is being driven by snow-ice albedo effects. A permanent ice sheet in the mid-latitudes of the North Hemisphere sounds like bad news. But panic is a little premature. Tom Crowley states that "our model predicts a rapid transition [to an ice age] beginning in the **10,000-100,000 years**. But the timing of this transition is surely model dependent -- it could easily be a quarter of million years or so -- still short from the context of geology but **almost infinite** from the viewpoint of society. Our results **in no way** can be interpreted as justification for continued use of fossil fuels, as that problem is **near term and very significant**."

## AT: Ice Age – Uniqueness Trick

### \*\*\*This may depend on the structure of the advantage. You can’t read this if you are saying “we solve all emissions ever”\*\*\*

### Status quo emissions are sufficient to solve an ice age – but the plan prevents massive increases by averting tipping points

Inman 8

Mason, “New Ice Age Predicted -- But Averted by Global Warming?,” 2008, National Geographic, http://news.nationalgeographic.com/news/2008/11/081112-ice-age-global-warming.html

"Climate skeptics could look at this and say, CO2 is good for us," said study leader Thomas Crowley of the University of Edinburgh in Scotland. But the idea that global warming may be staving off an ice age is "**not cause for relaxing**, because we're actually moving into a highly unusual climate state," Crowley added. In about 10,000 to 100,000 years, the study suggests, Antarctic-like "permanent" ice sheets would shroud much of Canada, Europe, and Asia. "I think the **present [carbon dioxide] levels** are probably sufficient to prevent that from ever happening," said Crowley, whose study will appear tomorrow in the journal Nature. Permanent Ice Sheets? For the past three million years, Earth's climate has wobbled through dozens of ice ages, with thick ice sheets growing from the poles and then shrinking back again. These ice ages used to last roughly 41,000 years. But in the past half a million years, these big freezes each stretched to about a hundred thousand years long. Meanwhile, the temperature swings during and between these ice ages became more extreme, soaring to new highs and lows. These extreme climate swings don't appear to be easing anytime soon, according to evidence recorded in Earth's rocks, Crowley said. "The latest two glaciations were two of the biggest we've seen." The increasing variability is a sign that Earth's climate will soon move into a new state, according to a computer model used by Crowley and a colleague, William Hyde of the University of Toronto in Canada. They had previously used the model to simulate past ice ages. But in the model, Europe and Asia also succumbed to ice sheets up to 2 miles (3.5 kilometers) thick, stretching from England to Siberia—something never before seen in models of past ice ages. "We were surprised," Crowley said. "There's no evidence for this in Asia" during ice ages in the past few million years. Hard to Know Though this extreme ice age would be unusual, so is the climate that people are creating by emitting huge amounts of greenhouse gases, Crowley said (global warming fast facts). "It's hard to say what's going to happen," Crowley said. "The very fact that you have this nonglacial [warming] atmosphere with polar ice caps [still present], presents a bizarre scenario. "I don't know that we have a comparable analogy for it in the geologic record." Prehistoric-climate expert Lorraine Lisiecki said, "This is the only study of which I am aware that suggests the next ice age could be much more extreme than those of the previous one million years." Many more tests are needed to see if the study's prediction seems correct, said Lisiecki, of the University of California, Santa Barbara. But she agreed that we might never find out what would have happened naturally, due to human-caused global warming. "**Current greenhouse gas concentrations** are probably similar to those that occurred three million years ago and are high enough to prevent an ice age for hundreds of thousands of years," she said.

## AT: Ice Age – Link Turn – Volcanoes

### Warming increases volcanic activity

Thompson 7 - MA from GA Tech

Andrea Thompson, Graduate from Georgia Tech with a B.S. in Earth and Atmospheric Sciences in 2004 and a Master's in the same subject in 2006. 2007, http://www.livescience.com/environment/070830\_gw\_quakes.html

Earthquakes, volcanic eruptions, tsunamis and landslides are some of the additional catastrophes that climate change and its rising sea levels and melting glaciers could bring, a geologist says. The impact of human-induced global warming on Earth's ice and oceans is [already noticeable](http://www.livescience.com/php/multimedia/imagegallery/igviewer.php?imgid=626&gid=42&index=0): Greenland's glaciers are melting at an increasing rate, and sea level rose by a little more than half a foot (0.17 meters) globally in the 20th century**,** according to the Intergovernmental Panel on Climate Change. With these trends in ice cover and sea level only expected to continue and likely worsen if atmospheric carbon dioxide levels continue to rise, they could alter the stresses and forces fighting for balance in the ground under our feet—changes that are well-documented in studies of past climate change, but which are just beginning to be studied as possible consequences of the current state of global warming. "Although they've described it in the past, nobody's thought about it in terms of future effects of climate change," said Bill McGuire of the University College London's Hazard Research Center. McGuire's speculations of increased geological activity have not yet been published in a journal, but he has written an article about them published in the Guardian Unlimited. Rebounding crust One particular feature that can change the balance of forces in Earth's crust is ice, in the form of glaciers and ice sheets that cover much of the area around Earth's poles plus mountains at all latitudes. The weight of ice depresses the crust on which it sits. As the ice melts, the crust below no longer has anything sitting on top of it, and so can rebound fairly rapidly (by geological standards). (This rebounding is actually occurring now as a result of the end of the last Ice Age: The retreat of massive ice sheets from the northern United States and Canada has allowed the crust in these areas to bounce back.) Areas of rebounding crust could change the stresses acting on [earthquake faults](http://www.livescience.com/php/trivia/?quiz=quake) and volcanoes in the crust. "In places like Iceland, for example, where you have the Eyjafjallajökull ice sheet, which wouldn't survive [global warming], and you've got lots of volcanoes under that, the unloading effect can trigger eruptions," McGuire said.

Causes an ice age

NASA 98

[http://www.gsfc.nasa.gov/gsfc/service/gallery/fact\_sheets/earthsci/eos/volcanoes.pdf] Volcanoes and Global Climate Change, Earth Science Enterprise Series/ May

The eruption of a super volcano "sooner or later" will chill the planet and threaten human civilization, British scientists warned Tuesday. And now the bad news: There's not much anyone can do about it.Several volcanoes around the world are capable of gigantic eruptions unlike anything witnessed in recorded history, based on geologic evidence of past events, the scientists said. Such eruptions would dwarf those of Mount St. Helens, Krakatoa, Pinatubo and anything else going back dozens of millennia. "Super eruptions are up to hundreds of times larger than these," said Stephen Self of Britain's Open University. "An area the size of North America can be devastated, and pronounced deterioration of global climate would be expected for a few years following the eruption," Self said. "They could result in the devastation of world agriculture, severe disruption of food supplies, and mass starvation. These effects could be sufficiently severe to threaten the fabric of civilization." Self and his colleagues at the Geological Society of London presented their report to the British government's Natural Hazard Working Group. "Although very rare, these events are inevitable, and at some point in the future humans will be faced with dealing with and surviving a super eruption," Stephen Sparks of the University of Bristol told LiveScience in advance of Tuesday's announcement. Supporting evidence The warning is not new. Geologists in the United States detailed a similar scenario in 2001, when they found evidence suggesting volcanic activity in Yellowstone National Park will eventually lead to a colossal eruption. Half the United States will be covered in ash up to 3 feet (1 meter) deep, according to a study published in the journal Earth and Planetary Science Letters. Explosions of this magnitude "happen about every 600,000 years at Yellowstone," says Chuck Wicks of the U.S. Geological Survey, who has studied the possibilities in separate work. "And it's been about 620,000 years since the last super explosive eruption there." Past volcanic catastrophes at Yellowstone and elsewhere remain evident as giant collapsed basins called calderas. A super eruption is a scaled up version of a typical volcanic outburst, Sparks explained. Each is caused by a rising and growing chamber of hot molten rock known as magma. "In super eruptions the magma chamber is huge," Sparks said. The eruption is rapid, occurring in a matter of days. "When the magma erupts the overlying rocks collapse into the chamber, which has reduced its pressure due to the eruption. The collapse forms the huge crater." The eruption pumps dust and chemicals into the atmosphere for years, screening the Sun and cooling the planet some models predict, causing many plant and animal species to disappear forever. "The whole of a continent might be covered by ash, which might take many years — possibly decades — to erode away and for vegetation to recover," Sparks said. Yellowstone may be winding down geologically, experts say. But they believe it harbors at least one final punch. Globally, there are still plenty of possibilities for super volcano eruptions, even as Earth quiets down over the long haul of its 4.5-billion-year existence. "The earth is of course losing energy, but at a very slow rate, and the effects are only really noticeable over billions rather than millions of years," Sparks said.

## AT: Ice Age – Link Turn – Warming Leads to Cooling

### Link turn – warming leads to ice age

Calvin 98 – theoretical neurophysicist @ U of W

William H. Calvin, Theoretical Neurophysicist at the University of Washington in Seattle, "The great climate flip-flop," The Atlantic Monthly 281:47-64

There are a few obvious precursors to flushing failure. One is diminished wind chill, when winds aren't as strong as usual, or as cold, or as dry — as is the case in the Labrador Sea during the North Atlantic Oscillation. This El Niño-like shift in the atmospheric-circulation pattern over the North Atlantic, from the Azores to Greenland, often lasts a decade. At the same time that the Labrador Sea gets a lessening of the strong winds that aid salt sinking, Europe gets particularly cold winters. It's happening right now: a North Atlantic Oscillation started in 1996. Another precursor is more floating ice than usual, which reduces the amount of ocean surface exposed to the winds, in turn reducing evaporation. Retained heat eventually melts the ice, in a cycle that recurs about every five years. Yet another precursor, as Henry Stommel suggested in 1961, would be the addition of fresh water to the ocean surface, diluting the salt-heavy surface waters before they became unstable enough to start sinking. More rain falling in the northern oceans — exactly what is predicted as a result of global warming — could stop salt flushing. So could ice carried south out of the Arctic Ocean. There is also a great deal of unsalted water in Greenland's glaciers, just uphill from the major salt sinks. The last time an abrupt cooling occurred was in the midst of global warming. Many ice sheets had already half melted, dumping a lot of fresh water into the ocean. A brief, large flood of fresh water might nudge us toward an abrupt cooling even if the dilution were insignificant when averaged over time. The fjords of Greenland offer some dramatic examples of the possibilities for freshwater floods. Fjords are long, narrow canyons, little arms of the sea reaching many miles inland; they were carved by great glaciers when the sea level was lower. Greenland's east coast has a profusion of fjords between 70°N and 80°N, including one that is the world's biggest. If blocked by ice dams, fjords make perfect reservoirs for meltwater. Glaciers pushing out into the ocean usually break off in chunks. Whole sections of a glacier, lifted up by the tides, may snap off at the "hinge" and become icebergs. But sometimes a glacial surge will act like an avalanche that blocks a road, as happened when Alaska's Hubbard glacier surged into the Russell fjord in May of 1986. Its snout ran into the opposite side, blocking the fjord with an ice dam. Any meltwater coming in behind the dam stayed there. A lake formed, rising higher and higher — up to the height of an eight-story building. Eventually such ice dams break, with spectacular results. Once the dam is breached, the rushing waters erode an ever wider and deeper path. Thus the entire lake can empty quickly. Five months after the ice dam at the Russell fjord formed, it broke, dumping a cubic mile of fresh water in only twenty-four hours. The Great Salinity Anomaly, a pool of semi-salty water derived from about 500 times as much unsalted water as that released by Russell Lake, was tracked from 1968 to 1982 as it moved south from Greenland's east coast. In 1970 it arrived in the Labrador Sea, where it prevented the usual salt sinking. By 1971-1972 the semi-salty blob was off Newfoundland. It then crossed the Atlantic and passed near the Shetland Islands around 1976. From there it was carried northward by the warm Norwegian Current, whereupon some of it swung west again to arrive off Greenland's east coast — where it had started its inch-per-second journey. So freshwater blobs drift, sometimes causing major trouble, and Greenland floods thus have the potential to stop the enormous heat transfer that keeps the North Atlantic Current going strong.

## AT: Ice Age – Prefer Our Evidence

### No Ice Age – Even warming skeptics deny it – studies prove

Chameids 09 – Environment Professor at Duke University (Bill, The Old Ice Age myth put to rest, <http://www.nicholas.duke.edu/thegreengrok/aerosolsandcooling>)

Global warming skeptics often point to an “imminent ice age” touted by the popular press in the 1970s to dissuade the public from believing today’s very real threat of global warming. The argument was always a red herring, and now a new paper resolves the scientific issues raised by the supposed warnings. As early as the [nineteenth century](http://www.aip.org/history/climate/co2.htm), scientists recognized that greenhouse gases warm the planet, and that increases in atmospheric carbon dioxide (CO2) could lead to global warming on much shorter time scales than the natural, cyclic fluctuations related to ice ages and interglacials. Around the same time, global temperatures began to rise, and scientists became increasingly concerned that humans were interfering with the climate. What Happened in the Mid-Twentieth Century In the 1950s the upward trend in global temperatures unexpectedly halted and temperatures declined somewhat. This led some to become concerned about global cooling, and, in turn, newspaper headlines proclaimed an imminent iceage. Climate skeptics often point to that period as evidence that climate scientists are not to be trusted – warnings of global cooling back then, warnings of global warming now. (It is ironic that many climate skeptics are now beating the warning drums of an [imminent new ice age](http://nicholas.duke.edu/insider/thegreengrok/futureclimate).) What the skeptics fail to admit is that within the scientific literature — as opposed to the mainstream press — there **was no consensus** that global cooling would be a long-term trend and global warming **remained a serious concern**. A favorite news article cited by climate skeptics is from Newsweek in April 1975: “[The Cooling World [pdf]](http://denisdutton.com/newsweek_coolingworld.pdf).” And yet even this piece made abundantly clear that, as far as the scientific community was concerned, there was little certainty as to what was occurring. Here‘s an excerpt: "'Our knowledge of the mechanisms of climatic change is at least as fragmentary as our data,' concedes the National Academy of Sciences report. 'Not only are the basic scientific questions largely unanswered, but in many cases we do not yet know enough to pose the key questions.'" Global Warming Was a Persistent Concern In fact in 1979, just four years after that article, the National Academy of Sciences warned that a doubling of CO2would increase global temperatures by 1.5 to 4.5 degrees Celsius ("Carbon Dioxide and Climate: A Scientific Assessment," NAS Press, 1979), and shortly thereafter a resumption of the upward trend in temperatures was detected. Over the past quarter century, scientific research on global climate change has intensified; international programs have been organized. We now have detailed, global data sets from satellites and ever-more sophisticated instruments. Computer models, incorporating more and more data and capable of recreating past trends, can more precisely predict future scenarios. As a result, our understanding of the climate system is immeasurably stronger than in the 1970s. The National Academy of Sciences, which admitted we did not know enough to “pose the key questions” in 1975, now says: "Greenhouse gases are accumulating in the Earth’s atmosphere as a result of human activities, causing surface air temperatures ... to rise.” ([NAS](http://books.nap.edu/openbook.php?record_id=10139&page=1), 2001) "The scientific understanding of climate change is now sufficiently clear to justify nations taking prompt action. ... We urge all nations ... to take prompt action to reduce the causes of climate change.” ([NAS [pdf](http://www.nationalacademies.org/onpi/06072005.pdf)], 2005) Now that’s a consensus. Particulate Pollution from Burning Coal Kept Warming Temporarily at Bay So what about that mid-twentieth century cooling? A comprehensive understanding of the climate requires an understanding of that event. Here’s what we’ve figured out. Shortly after World War II, America’s and Europe’s industrial capacity skyrocketed. Much of that industrial expansion was fueled by coal – the [dirtiest fossil fuel](http://www.nicholas.duke.edu/thegreengrok/morecoalwaste). Burning coal produces a range of air pollutants. Among these are aerosols, tiny particles that produce haze and prevent sunlight from penetrating the Earth’s surface, effectively cooling the planet. This pollution from burning coal is nasty stuff. At different points in history, it has been so bad that literally hundreds of people have been hospitalized or perished (see [here](http://www.enviropedia.org.uk/Air_Quality/Great_London_Smog.php) and [here](http://www.epa.gov/apti/course422/apc1.html)). And so in the late 1970s and 1980s we began to burn less coal and mandate pollution-control devices. As a result, particulate pollution declined, the cooling effect of these aerosols was overwhelmed by the greenhouse gases, and global warming resumed. (See related [post](http://www.nicholas.duke.edu/thegreengrok/cooling).) A picture began to emerge that linked the dip in mid-twentieth century temperatures to increased coal-burning. New Recreation Confirms Theory of Short Cooling Period Great theory, but how do we know it is correct? Enter Rolf Philipona of the Swiss federal agency MeteoSwiss and his colleagues. In their [study](http://www.agu.org/pubs/crossref/2009/2008GL036350.shtml), published inGeophysical Research Letters, they recreated the warming/cooling trends caused by changes in particulate pollution and greenhouse gases. To do this, they analyzed measurements of surface sunlight, temperatures, and humidity collected from 1980 to the present at 25 stations in Switzerland and eight in Germany. Their analysis shows that increases in the solar radiation reaching the surface at these sites – almost certainly due to declining particulate pollution – led to the reversal in the cooling and the rapid increase in temperature over the region of study. (Note: satellite observation shows that the increased solar radiation reaching the surface [cannot be explained](http://www.nicholas.duke.edu/thegreengrok/solarvariation) by an increase in the output of energy from the sun. Slow but steady and firmly based on real data – that’s how science advances. This study adds yet another detail to our understanding of climate change and confirms that we are on the right track. In this case, the data collected at surface sites in Europe give us more evidence for what caused the anomalous cooling period in the 1970s – and why warming kicked in again as soon as the particulate pollution was dramatically reduced.

## AT: Ice Age

### They are wrong…

### But, SSP can be used for heating

Hempsell 6 - University of Bristol

Mark Hempsell, Mark, “Space power as a response to global catastrophes,” 2006, Acta Astronautica, v. 59, Science Direct

One of the common features of past natural global catastrophes is a cooling of the Earth’s climate, which is the key vector triggering famine, disease and other causes of death. In cases of NEO impact and caldaria volcanoes this is caused by material in the atmosphere and lasts for over a year. The cause of the cooling dur- ing the little ice age is less certain but it lasted for a considerable period of time. A system to counter this cooling would have widespread applicability and great efﬁcacy in these cases, and could in itself prevent the majority of deaths. The system would not have to heat the whole Earth but rather selectively target regions where cooling in- duced effects create a hazard. Examples might be heat- ing plague reservoirs regularly to above 25◦ to prevent breakout of the disease, ensuring snow melt in early spring in high latitude countries (so ice reﬂectivity does not reduce solar heating) reducing occurrence of frost in high-yield agricultural areas, and the heating of ocean regions to ensure viable rainfall. If a signiﬁcant SPS capability existed that used microwave power transmission, then **heating could be achieved** by defocusing the transmission antenna and pointing the power beam at the area that requires heating. That is to use the SPS as a microwave oven. This is clearly a “zero cost” option as no new sys- tems are required and one 5 GW unit could provide 10 mW/cm2 –500 km2 (a circle 25 km diameter at the equator). In practice, the target areas are more likely to be in the order several 100 km in diameter so tens of SPS would need to be used together.

## AT: Link Turn – Production / Launch / Heating

### The aff solves the link – warming effects of production are minimal

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

Summary Observations: Is SPS a “Green Energy” Solution?. More detailed studies are needed, including integrated input-output matrix studies in order to better understand the true energy investments needed for SPS, and the resulting energy payback times that are required for these systems. However, at a high-level it appears that SPS could be a highly “green” option, with minimal energy cost for SPS space transportation, good energy payback times compared to centralized ground PV solar power plants, and **extremely** **small contributions** to increasing Earth’s temperature.

### Doesn’t contribute to heat trapping

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

The final global effect is not obvious, but also important. While it may seem intuitively obvious that SBSP introduces heat into the biosphere by beaming more energy in, the **net effect is quite the opposite**. All energy put into the electrical grid will eventually be spent as heat, but the methods of generating electricity are of significant impact for determining which approach produces the least total global warming effect. Fossil fuel burning emits large amounts of waste heat and greenhouse gases, while terrestrial solar and wind power also emit significant amounts of waste heat via inefficient conversion. Likewise, SBSP also has solar conversion inefficiencies that produce waste heat, but the key difference is that the most of this waste heat creation occurs outside the biosphere to be radiated into space. The losses in the atmosphere are very small, on the order of a couple percent for the wavelengths considered. Because SBSP is not a greenhouse gas emitter (with the exception of initial manufacturing and launch fuel emissions), it does not contribute to the trapping action and retention of heat in the biosphere.

### The aff solves the link – comparative

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

If the SPS concept can be developed successfully, solar power satellites would provide an extremely “green” sustainable energy alternative for the future. A preliminary analysis was performed to determine the expected heating that might be expected due to a solar power satellite beaming energy to Earth that would otherwise have passed without inception in nearby space. \*\*\*\*\*\*\* From this analysis, it appears that a single SPS that delivered power of about 1.5 GW would add less than 0.000001 °C to Earth’s average temperature. Similarly, it appears that several thousand SPS with a total delivered power of about 15,000 GW (equivalent to the total global consumption of power circa 2005-2010) would result in less than 0.006 °C increase to Earth’s temperature – an **extremely tiny amount** compared to the aggregate thermal effects of similar power production from fossil fuels

## Impact – Environment

### Environmental destruction leads to extinction

Coyne and Hoekstra 7 – \*Professor in the Department of Ecology and Evolution at the University of Chicago AND \*\* Associate Professor in the Department of Organismic and Evolutionary Biology at Harvard University (\*Jerry and \*Hopi, “The Greatest Dying”, The New Republic, September 24th 2007, June 26th 2010, <http://www.truthout.org/article/jerry-coyne-and-hopi-e-hoekstra-the-greatestdying>)

Every year, up to 30,000 species disappear due to human activity alone. At this rate, we could lose half of Earth's species in this century. And, unlike with previous extinctions, there's no hope that biodiversity will ever recover, since the cause of the decimation - us - is here to stay. To scientists, this is an **unparalleled calamity**, far more severe than global warming, which is, after all, only one of many threats to biodiversity. Yet global warming gets far more press. Why? One reason is that, while the increase in temperature is easy to document, the decrease of species is not. Biologists don't know, for example, exactly how many species exist on Earth. Estimates range widely, from three million to more than 50 million, and that doesn't count microbes, critical (albeit invisible) components of ecosystems. We're not certain about the rate of extinction, either; how could we be, since the vast majority of species have yet to be described? We're even less sure how the loss of some species will affect the ecosystems in which they're embedded, since the intricate connection between organisms means that the loss of a single species can ramify unpredictably. But we do know some things. Tropical rainforests are disappearing at a rate of 2 percent per year. Populations of most large fish are down to only 10 percent of what they were in 1950. Many primates and all the great apes - our closest relatives - are nearly gone from the wild. And we know that extinction and global warming act synergistically. **Extinction exacerbates global warming**: By burning rainforests, we're not only polluting the atmosphere with carbon dioxide (a major greenhouse gas) but destroying the very plants that can remove this gas from the air. Conversely, global warming increases extinction, both directly (killing corals) and indirectly (destroying the habitats of Arctic and Antarctic animals). As extinction increases, then, so does global warming, which in turn causes more extinction - and so on, into a downward spiral of destruction. Why, exactly, should we care? Let's start with the most celebrated case: the rainforests. Their loss will worsen global warming - raising temperatures, melting icecaps, and flooding coastal cities. And, as the forest habitat shrinks, so begins the inevitable contact between organisms that have not evolved together, a scenario played out many times, and one that is never good. Dreadful diseases have successfully jumped species boundaries, with humans as prime recipients. We have gotten aids from apes, sars from civets, and Ebola from fruit bats. Additional worldwide plagues from unknown microbes are a very real possibility. But it isn't just the destruction of the rainforests that should trouble us. Healthy ecosystems the world over provide hidden services like waste disposal, nutrient cycling, soil formation, water purification, and oxygen production. Such services are best rendered by ecosystems that are diverse. Yet, through both intention and accident, humans have introduced exotic species that turn biodiversity into monoculture. Fast-growing zebra mussels, for example, have outcompeted more than 15 species of native mussels in North America's Great Lakes and have damaged harbors and water-treatment plants. Native prairies are becoming dominated by single species (often genetically homogenous) of corn or wheat. Thanks to these developments, soils will erode and become unproductive - which, along with temperature change, will diminish agricultural yields. Meanwhile, with increased pollution and runoff, as well as reduced forest cover, ecosystems will no longer be able to purify water; and a shortage of clean water spells disaster. In many ways, oceans are the most vulnerable areas of all. As overfishing eliminates major predators, while polluted and warming waters kill off phytoplankton, the intricate aquatic food web could collapse from both sides. Fish, on which so many humans depend, will be a fond memory. As phytoplankton vanish, so does the ability of the oceans to absorb carbon dioxide and produce oxygen. (Half of the oxygen we breathe is made by phytoplankton, with the rest coming from land plants.) Species extinction is also imperiling coral reefs - a major problem since these reefs have far more than recreational value: They provide tremendous amounts of food for human populations and buffer coastlines against erosion. In fact, the global value of "hidden" services provided by ecosystems - those services, like waste disposal, that aren't bought and sold in the marketplace - has been estimated to be as much as $50 trillion per year, roughly equal to the gross domestic product of all countries combined. And that doesn't include tangible goods like fish and timber. **Life** as we know it **would be impossible if ecosystems collapsed**. Yet that is where we're heading if species extinction continues at its current pace. Extinction also has a huge impact on medicine. Who really cares if, say, a worm in the remote swamps of French Guiana goes extinct? Well, those who suffer from cardiovascular disease. The recent discovery of a rare South American leech has led to the isolation of a powerful enzyme that, unlike other anticoagulants, not only prevents blood from clotting but also dissolves existing clots. And it's not just this one species of worm: Its wriggly relatives have evolved other biomedically valuable proteins, including antistatin (a potential anticancer agent), decorsin and ornatin (platelet aggregation inhibitors), and hirudin (another anticoagulant). Plants, too, are pharmaceutical gold mines. The bark of trees, for example, has given us quinine (the first cure for malaria), taxol (a drug highly effective against ovarian and breast cancer), and aspirin. More than a quarter of the medicines on our pharmacy shelves were originally derived from plants. The sap of the Madagascar periwinkle contains more than 70 useful alkaloids, including vincristine, a powerful anticancer drug that saved the life of one of our friends. Of the roughly 250,000 plant species on Earth, fewer than 5 percent have been screened for pharmaceutical properties. Who knows what life-saving drugs remain to be discovered? Given current extinction rates, it's estimated that we're losing one valuable drug every two years. Our arguments so far have tacitly assumed that species are worth saving only in proportion to their economic value and their effects on our quality of life, an attitude that is strongly ingrained, especially in Americans. That is why conservationists always base their case on an economic calculus. But we biologists know in our hearts that there are deeper and equally compelling reasons to worry about the loss of biodiversity: namely, simple morality and intellectual values that transcend pecuniary interests. What, for example, gives us the right to destroy other creatures? And what could be more thrilling than looking around us, seeing that we are surrounded by our evolutionary cousins, and realizing that we all got here by the same simple process of natural selection? To biologists, and potentially everyone else, apprehending the genetic kinship and common origin of all species is a spiritual experience - not necessarily religious, but spiritual nonetheless, for it stirs the soul. But, whether or not one is moved by such concerns, it is certain that our future is bleak if we do nothing to stem this sixth extinction. We are creating a world in which exotic diseases flourish but natural medicinal cures are lost; a world in which carbon waste accumulates while food sources dwindle; a world of sweltering heat, failing crops, and impure water. In the end, we must accept the possibility that we **ourselves are not immune to extinction**. Or, if we survive, perhaps only a few of us will remain, scratching out a grubby existence on a devastated planet. Global warming will seem like a secondary problem when humanity finally faces the consequences of what we have done to nature: not just another Great Dying, but perhaps the greatest dying of them all.

# \*Military Dependence Extensions

## Uniqueness – AT: Squo Solves

### Status quo policies are good but don’t provide a long term solution

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

Though each of the services has admirably developed its own energy strategy to improve its near-term energy management, DOD must also develop a comprehensive long-term energy strategy. The strategies developed by individual services focus heavily on electricity usage at domestic installations, which accounts for a relatively small fraction of DOD’s energy needs, and most goals within these strategies do not look beyond 2015 or 2020 – a timeline that is too short to ensure DOD’s long-term energy security. Moreover, there is no single official who oversees DOD’s entire energy portfolio; authority within DOD is currently divided, which is likely to complicate implementation of the strategy. This report lays out the strategic necessity for DOD to find alternatives to petroleum over the next 30 years and then presents important steps in achieving that long-term goal.

## Link – SPS Solves

### SPS would replace fossil fuels

NSSO 7 \*National Security and Space Office of the USFG [<http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf>, October 10th 2007, “Space Based Solar Power As an Opportunity for Strategic Security]

For the DoD specifically, beamed energy from space in quantities greater than 5 MWe has the potential to be a disruptive game changer on the battlefield. SBSP and its enabling wireless power transmission technology could facilitate extremely flexible “energy on demand” for combat units and installations across an entire theater, while significantly reducing dependence on vulnerable over‐land fuel deliveries. SBSP could also enable entirely new force structures and capabilities such as ultra long‐endurance airborne or terrestrial surveillance or combat systems to include the individual soldier himself. More routinely, SBSP could provide the ability to deliver rapid and sustainable humanitarian energy to a disaster area or to a local population undergoing nation‐building activities. SBSP could also facilitate base “islanding” such that each installation has the ability to operate independent of vulnerable ground‐ based energy delivery infrastructures. In addition to helping American and allied defense establishments remain relevant over the entire 21 st Century through more secure supply lines, perhaps the greatest military benefit of SBSP is to lessen the chances of conflict due to energy scarcity by providing access to a strategically secure energy supply.

### SPS takes the military off the grid

Ramos 0 \*Kim Ramos is a U.S. Air Force Major the paper is a thesis submitted for the AIR COMMAND AND STAFF COLL MAXWELL Air Force Base [“Solar Power Constellations: Implications for the United States Air Force,” April, <http://handle.dtic.mil/100.2/ADA394928>]

Terrestrially solar power satellites enable information superiority technologies such as the unmanned aerial vehicle. Coupling an unmanned aerial vehicle with a solar power satellite enables it to loiter over an area indefinitely. Using solar power satellites to power deployed sites enables focused logistics by reducing airlift requirements, various signatures, and the logistics tail. In garrison, the use of solar power satellites to power home bases enables the Air Force to comply with public law to meet its environmental obligations. Electrical power received from a solar power satellite also enables base independence from the local power grid in times of emergencies.

## Link – Oil Hurts Readiness

### DOD energy dependence kills readiness

Crowley et. al 7\*Thomas D. Crowley is a Policy Consultant for LMI \*\*Tonya D. Corrie is a policy consultant for LMI \*\*\*David B. Diamond is a policy consultant for LMI\*\*\*\*Stuart D. Funk is a policy Consultant for LMI\*\*\*\*\*Wilhelm A. Hansen, Andrea D. Stenhoff, and Daniel C. Swift are policy consultants for LMI\*\*\*\*\*\*LMI is a governmental consulting organization [<http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA467003>, april 2007, “Transforming the Way DOD Looks at Energy”]

DoD’s heavy operational dependence on traditional fuel sources creates a number of decidedly negative effects: DoD shares the nation’s reliance on foreign energy sources, which effectively forces the country to rely on potential adversaries to maintain its economy and national security. 2 DoD’s energy dependence exposes the department to price volatility, forcing it to consume unplanned resources that could be used to recapitalize an aging force structure and infrastructure. The availability of traditional energy supplies beyond 25 years is difficult to project. Because of the 8- to 20-year time frame of future operational concepts and a similarly long, or longer, capital asset replacement cycle for DoD platforms, DoD must begin now to address its uncertain energy future. The United States bears many costs associated with the stability of the global oil market and infrastructure. The cost of securing Persian Gulf sources alone comes to $44.4 billion annually. 3 DoD receives little support from other consuming nations to perform this mission although they share in the benefits due to the global nature of the oil market

## Impact – Key to Budget

### Successful transition saves the budget

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

A successful transition away from petroleum will produce financial, operational and strategic gains. Reducing dependence on petroleum will help ensure the long-term ability of the military to carry out its assigned missions — and help ensure the security of the nation. Though adopting nonpetroleum fuels will require an initial investment, it will likely be recouped in budget savings over the long term. Finally, moving beyond petroleum will allow DOD to lead in the development of innovative technologies that can benefit the nation more broadly, while signaling to the world that the United States has as innovative and adaptable force. This transition should not compromise readiness and, indeed, DOD must always put mission first. However, DOD need not choose between accomplishing its mission and minimizing the strategic risks, price fluctuations and negative environmental effects of petroleum consumption. By providing the private sector with stable market signals and incentives to invest in scaling up the fuels that meet its unique energy needs, DOD will never need to sacrifice performance or national security for energy security. Rather, reducing reliance on petroleum will only help the armed services to accomplish their missions in the years and decades to come.

## Impact – Navy

### Warming decimates naval dominance

Burke et al. 8 \*Sharon Burke is a senior fellow at center for new American security \*\*Dr. Jay Gulledge is the senior scientist for the pew center on global climate change \*\*\*Dr. Michael Horowitz is a non-resident fellow at center for new American security \*\*\*\*Christine Parthemore is a research associate at Center for new American security \*\*\*\*\*Nirav Patel is the Bacevich fellow at center for new American security [<http://www.cnas.org/files/documents/publications/CNAS_Working%20Paper_CNO_ClimateChange_BurkePatel_Dec2008.pdf>, December 2008, “Uncharted Waters: The U.S. Navy and Navigating Climate Change”]

Changes in surface conditions may also have implications for the U.S. Navy. Climate change may have effects on ocean currents (e.g., the North Atlantic Current) and induce violent weather events (e.g., hurricanes) that will mean new challenges. Severe weather events may have consequences on naval mobility, operations, and maintenance. Today, the Navy deals with extreme weather largely by avoiding it, thanks to an extensive system of sensing technologies, largely managed through the Naval Meteorology and Oceanography Command and civilian agencies. Despite past and anticipated improvements in forecasting, the possible increase in the frequency of intense tropical storms means that such weather systems may become harder to avoid and more dangerous. Current doctrine is to avoid significant storms by finding safe harbor or calmer seas. Furthermore, violent tropical storms also put tremendous stress on U.S. ships and vital facilities that are susceptible to damage from high winds and waves. Maintenance and construction schedules could be disrupted, for example, if port facilities are damaged by tropical storms and high storm surges. The late Admiral Donald Pilling, USN (ret.), noted, “We spent a few billion to restore Pascagoula after Hurricane Katrina—and we’re not done yet. But at least that’s an impact you can see.” 33 Restoring operations for these facilities can cost billions of dollars as well as reduce operational availability of ships. 34 Moreover, severe storms can have direct impacts on operational readiness and training. According to General Paul Kern (USA, ret.) as quoted in the ground-breaking CNA study on climate change and national security, large tropical storms and hurricanes force the military to reposition assets out of harm’s way. This involves tremendous amounts of manpower, energy, resources, and time. Kern draws upon an experience when Hurricane Hugo was projected to hit Savannah, Georgia. During this time the Navy was also preparing for a military exercise with NATO counterparts. Unfortunately, the storm diverted resources by forcing American forces to deal with moving equipment to safe harbor, which eventually produced suboptimal results for the military war game. This led Kern to conclude that extreme weather conditions can have deleterious effects on operational readiness. 35 Additionally, there is growing evidence that power projection can be hindered by extreme weather events. Even though the men and women of America’s armed forces are trained and prepared to fight in any condition, inclement weather does take a toll on sailors’ physical and mental wellbeing. For example, in warmer climates, such as the Middle East, surface temperatures on the decks of aircraft carriers can reach temperatures above 120 o F, putting great strain on the deck crew’s ability to launch planes. 36 Additionally, leading studies have shown that this can have negative repercussions on the crew’s ability to sustain high tempo operations. 37 Although naval training already prepares sailors for a variety of inclement conditions, the Navy may need to reassess this training for more persistent high-heat conditions and other new considerations associated with climate change, such as the presence of cyclonic storms in unanticipated locations (e.g. Hurricane Vince in 2005) or more intense storms. More frequent and intense weather events will also compel ships to deal with greater fluctuation in sea states, which may affect naval mobility. Because of these fluctuations, ships may need to re-chart courses to avoid high-waves or risk being battered and damaged by large waves. Note that the independent deployers are more at risk, given that they rarely have a meteorological capability (METOC detachment) on board. Furthermore, during high-sea states, aircraft carriers may need to curtail flight operations as landing planes becomes extremely difficult. In such circumstances, flight deck personnel and aircraft are at great risk. These operational challenges are difficult to plan against, but training programs can help. Finally, climate change may result in major changes to ocean currents, though it is possible that such changes may be beyond the 30 yea horizon of this report. Scientists believe the most significant climate-induced threat to ocean systems is the potential for a shutdown of the thermohaline circulation system. 38 Increasing amounts of fresh water caused by ice melt in the Arctic will decrease—and potentially stop—the transport of warm waters from the tropical North Atlantic to the northern North Atlantic. These changing currents would have dramatic impacts on the climate of the North Atlantic region and may affect navigation routes. In the near- to mid-term, the United States should consider supporting international efforts aimed at better understanding and monitoring of major ocean currents

## Impact – Try or Die

### Now is critical, any delay dooms readiness

Parthemore and Nagl 10\*Christine Parthemore is a fellow at the Center for New American Security \*\*Dr. John Nagl is President of the Center for New American Security [<http://www.cnas.org/files/documents/publications/CNAS_Fueling%20the%20Future%20Force_NaglParthemore.pdf>, “Fueling the Future Force Preparing the Department of Defense for a Post-Petroleum Era” September 2010]

Despite the 30-year timeline, DOD does not have several decades to begin this transition. The renewable fuel development, testing and evaluation that the services have conducted to date mark the first steps in guaranteeing their long-term ability to meet their energy needs, but even if DOD adopts a hastened timeline, it will take decades to complete this transition. Implementing this strategy must therefore begin immediately.

## Impact – Peak Oil Coming

### And the link only goes our way, we’ve passed peak oil which means prices only go up from here, try or die for the aff

Martenson 11\*Chris Martenson is an economic researcher and futurist, published in the Business Times [<http://www.businessinsider.com/why-time-is-short-now-that-were-past-peak-oil-2011-5>, May 27th 2011, published in the business times, “Why Time is Short Now that We’re Past Peak Oil”]

The only thing that could prevent another oil shock from happening before the end of 2012 would be another major economic contraction. The emerging oil [data](http://www.businessinsider.com/why-time-is-short-now-that-were-past-peak-oil-2011-5) continues to tell a tale of ever-tightening supplies that will soon be exceeded by rising global demand. This time, we will not be able to blame speculators for the steep prices we experience; instead, we will have nothing to blame but geology. Back in 2009, I wrote a pair of reports in which I calculated that we’d see another [price](http://www.businessinsider.com/why-time-is-short-now-that-were-past-peak-oil-2011-5) spike in oil by 2010 or 2011, based on some assumptions about global GDP growth rates, rates of decline in existing oil fields, and new projects set to come online. Given the recent price spike in oil (Brent crude over $126, now at $115) and recent oil supply data, those predictions turned out to be quite solid (for reference, oil was trading in the low $60s at the time). One part I whiffed on was in my prediction that the world community would have embraced the idea of Peak Oil by now and begun adjusting accordingly, but that’s not really true except in a few cases (e.g. Sweden). Perhaps things are being differently and more seriously considered behind closed doors, but out in public the dominant story line concerns reinvigorating consumer demand, not a looming liquid fuel crisis. How the major economies can continue proceeding with a business-as-usual mindset given the oil data is really quite a mystery to me, but that’s just how things happen to be at the moment. At any rate, with Brent crude oil having lofted over $100/bbl at the beginning of February and remained above that big, round number for four months now, we are already in the middle of a price shock. It may not be a perfect repeat of the circumstances of the 2008 oil shock, but it's close enough that the risk of an economic contraction, at least for the weaker economies, is not unthinkable here. Japan, now in recession and 100% dependent on oil imports, comes to mind. Looking at the new data and reading even minimally between the lines of recent International Energy Agency (IEA) statements, I am now ready to move my ‘Peak Oil is a statistically unavoidable fact’ event to sometime in 2012, which tightens my prediction from the prior range of 2012-2013. Upon this recognition, the next shock will drive oil to new heights that are currently unimaginable for most. First, $200/bbl will be breached, then $300, and then more. And these are in current dollar terms; any additional dollar weakness will simply be additive to the actual quoted price. By this I mean that if oil were to trade at $200 but the dollar lost one half of its value along the way, then oil would be priced at $400. Stampeding Into a Box Canyon [In 2009, I wrote a special report on oil](http://www.chrismartenson.com/martensonreport/oil-coming-supply-crunch-part-i) that explored the interplay between energy and the economy. At that time, the stock market was in the tank, global growth was in a freefall, and things looked gloomy. But I knew that thin-air money is not without its charms and that we’d experience a rebound of sorts. Here’s what I wrote: I am of the opinion that these trillions and trillions of dollars, which, along with their foreign equivalents, are being applied to “ease the credit crunch,” will eventually find their mark and deliver what feels like a legitimate rebound in activity. All those trillions have to eventually go somewhere and do something. For now, debts are defaulting faster than the various central banks and governments can inject new money and borrowing activity into the system. Banks aren’t lending because there are very few compelling loans to make, especially if future losses have to actually be carried by the bank making the loan. But this won’t be true forever. Sooner or later, all the trillions of new dollars will trot out of the barn, begin to gallop, and then thunder off, creating the appearance of a healthy advance. It will be a cruel illusion, though, as this stampeding herd of money is headed straight into a box canyon. Money is only one component of growth. As we’ve strenuously proposed, energy is a necessary prerequisite for growth. ([Source](http://www.chrismartenson.com/martensonreport/oil-coming-supply-crunch-part-i)) Well, here we are a couple of years later, with those trillions and trillions out of the barn and stampeding off trying to create some real and lasting economic growth. As we score these efforts, it appears to us that the amount and type of growth that has been achieved is underwhelming, to say the least. Housing remains in a serious slump, wage-based income growth is poor, Europe remains mired in a serious debt crisis, Japan has slumped back into recession, and the US fiscal deficit is a structural nightmare. Worse, GDP growth is relatively tepid and would be negative, *deeply* negative, without all the deficit spending and liquidity measures. As predicted, all that thin-air money, once released into the wild, had a mind of its own and created a serious bout of commodity inflation, especially in food and fuel, which is now seriously impacting the poor and middle classes. So it’s hard to call the trillions and trillions ‘well spent.’ I was hoping for better results. Yet we can’t call the re-flation efforts a complete failure, as we are not in a serious, destructive deflation, and we’ve all been granted a bit more time to get ourselves prepared in whatever ways make sense. The gift of time has been invaluable, and for that I am grateful. But in terms of creating a true and lasting economic miracle? It turns out, once again, that 'printing' money electronically is no more effective than calling in the silver coin of the realm, making each unit slightly smaller, and then re-issuing it. Real economic growth has not been created. What *has* happened is that false demand, spurred on by trillions in thin-air money, has also spurred on renewed demand for oil, hastening the day that a geologically inspired supply/demand mismatch will finally arrive. We are driving at a high rate of speed into a box canyon. World Crude Supply Before we get into the specifics of where I think the immediate trouble lies in the world oil data, let's take a moment to look at the big picture. There are a number of ways to look at the petroleum data. The one I prefer to look at is something called 'crude + condensate' (C+C), which leaves out things like ethanol and natural gas liquids, both of which are converted to 'barrel of oil equivalents' (BOE) and added to the C+C to yield total liquid fuels. The reason I like to focus on C+C is that this is mainly conventional oil, the cheap and easy stuff, and it gives us a better idea of where we are in the Peak Oil story. ***Note:*** *This next cluster of charts comes from data from the U. S. Energy Information Administration (EIA) that I am, frankly, uncomfortable with, so take them all with a grain of salt. The EIA upwardly revised the data for 2010 and added between 750,000 and 800,000 barrels per day of production to each month. This is the largest upward revision of which I am aware, and it's not yet clear to me why this occurred. Further, the EIA obtained some of that data from IHS, which is the parent company of CERA, the organization that best qualifies for the 'influential Peak Oil deniers of the decade' award. And somewhat ominously, as suspect as the data may be, it has been an important source for decades for analysts, myself among them. Quite recently, the EIA has announced that, due to budget cutbacks, it will immediately terminate the collection and distribution of international energy statistics -- right at the exact moment they are needed most. Ugh. Very disappointing, and all due to a $15 million budget cut. (*[*Source*](http://www.eia.doe.gov/pressroom/releases/press362.cfm)). *This echoes the loss of the M3 monetary statistic, which turned out to be a perfect gold-buying signal. If this is a parallel event, it means that now is a great time to take Peak Oil more seriously.* A chart of C+C reveals that the world has been bouncing along in a channel roughly between 72 and 74 mbd since 2005 Yes, a new high was made in December 2010 and was exceeded in January 2011, offering hope that the world could break out of this limiting band of production, but then production fell back in February due to the Libyan conflict. I have added a purple dotted line to reflect where the data will most likely be for March after subtracting out the Libyan losses and the Saudi cutbacks. As you can see, we will be right back in the 72-74 channel. Some will be tempted to write this off to a temporary setback due to the unrest in North Africa, but such unrest has always been part of the equation: Iraq, Nigeria, Kuwait, and many other countries have experienced supply disruptions along the way due to war and/or civil unrest. Note also in this chart that oil production fell off by more than 2 mbd as a consequence of the global recession between 2008 and 2009. From the lows in August 2009, it has since climbed more than 2.4 mbd to its current level. Where did those gains come from? Can we expect more? There's a very interesting story in here if we dig down one more layer. This next pie chart shows each region's relative contribution to the gains of 2.4 mbd that happened between August 2009 and February 2011: In the above chart, I had to include negative percentages for two regions, which is an odd way to display things (how does one draw a negative pie wedge?), but it still all sums to 100%. I've included the negatives for comparison purposes and because they are important to keep in view. It's clear that the Middle East is the most important region; no surprise there. North America is about evenly split in gains between the US (Bakken) and Canada (tar sands), and Russia and China are the major players in their respective regions. Taking the analysis one level deeper, here are the seven major countries that contributed 88% of the August 2009 to February 2011 gains (in thousands of barrels per day): Saudi Arabia is the hands-down leader, being responsible for 700,000 barrels per day, or 29%, of the entire gains logged in that period. There is a variety of interesting sub-stories that could be told across each of the other countries, but it's time to focus on the big fish. Saudi Arabia – Where There's Smoke, There's Fire Something is seriously wrong with the signals coming from the Kingdom of Saudi Arabia (KSA), and I am of the opinion that KSA is having geological difficulties that are preventing it from pumping more oil. Said plainly, I am of the mind that the KSA is already at peak. One troubling bit of information is that Saudi Arabia justified its lowered oil output for March by claiming that the oil markets are oversupplied, even as Brent crude was perched above $120/bbl. There are several possibilities here: There really is an oil glut, and the KSA is being truthful. There is an oversupply, but only of the heavier, poorer grades of oil that the KSA has in relative abundance. The KSA can produce more, but doesn’t want to, preferring to withhold oil production in the interest of receiving higher [prices](http://www.businessinsider.com/why-time-is-short-now-that-were-past-peak-oil-2011-5). The KSA is already past peak and cannot pump more, despite its best efforts, and the oversupply issue is really just a cover story for the fact that the KSA cannot pump more even if it wanted to. Let’s start at the beginning of this odd tale. Early in May, the KSA said this: [Saudi lifts April oil output to 8.5 mln bpd-sources](http://www.asiaone.com/Business/News/Story/A1Story20110501-276670.html) May 01, 2011 DUBAI/KHOBAR, Saudi Arabia, May 1 (Reuters) - Saudi Arabia's crude oil output edged back up in April to around 8.5 million barrels per day (bpd) from roughly 8.3 million bpd in March as demand picks up, Saudi-based industry sources said on Sunday. The kingdom slashed output by 800,000 bpd in March, due to oversupply, oil minister Ali al-Naimi said last month, adding that he expected production in April to be a little higher than March's level. So the story here is that the KSA claims to have 12.5 mbd of total capacity. Therefore, meeting the Libyan shortfalls of 1.3 mbd should be simple enough; just open the taps and let it flow. Yet the KSA barely cracked the 9 mbd mark, briefly, before falling back to 8.3 – 8.5 mbd, telling the world that this was a purposeful response to markets that were oversupplied. That's one possibility. Several analysts thought that perhaps the KSA was simply gaming the markets and trying to obtain the best possible prices: [Saudi unlikely to lift oil output quickly](http://www.google.com/hostednews/afp/article/ALeqM5jRLET3aguOXpLJJRHyOjqYCSkjBA?docId=CNG.a3f8092c66918f0cedb929502b657e94.411) May 3, 2011 WASHINGTON — Saudi Arabia is unlikely to boost oil production quickly to ease the rise of crude prices, because it needs high prices for its own increased spending, analysts at an international banking think tank said Tuesday. After producing 8.6 million barrels a day in 2010, the world's leading oil supplier will only kick up production to about 8.9 million barrels this year, said analysts at the Washington-based Institute of International Finance. "So far the production of crude oil in Saudi Arabia for the first quarter was around 8.7, 8.8 (million barrels a day). And recently some unconfirmed reports said that production dropped in March," said Garbis Iradian, the IIF's deputy director for Africa and the Middle East. "So we don't expect crude oil production in Saudi Arabia will rise over nine million barrels a day," he said. While it's possible that the KSA production limitations are a matter of trying to engineer higher prices, one person I trust is Sadad Al-Husseini. The former Aramco engineer, who has a lot of credibility in these matters, thinks that the production limits have more to do with the grades of available oil rather than any mercenary market tactics on the part of KSA. [Saudi Sweet Oil Supply Too Low to Offset Libya, al-Husseini Says](http://www.bloomberg.com/news/2011-05-17/saudi-sweet-oil-supply-too-low-to-offset-libya-al-husseini-says.html) May 17, 2011 Saudi Arabia, the world’s biggest crude exporter, won’t be able to produce enough low-sulfur blends to replace lost Libyan output for refiners in Europe, said Sadad al-Husseini, a former Saudi Aramco executive. The country doesn’t have enough Arab Super Light to create sufficient amounts of low-sulfur, or sweet, oil similar to Libya’s grades, al-Husseini, Aramco’s former executive vice president for exploration and development, said today by e-mail. The basic problem is that each refinery is geared for a specific and relatively narrow band of crude oil feedstocks, with the specific gravity and sulfur content being the most critical factors. So it is not as simple as the KSA pumping more heavy sour crude to offset the lost Libyan production. This is yet another possible explanation, and it is far more believable to me than either oversupplied markets or a pricing strategy. The somewhat shocking news that followed just a few days after the above article was the begging by the IEA for OPEC to lift production. Such a frank admission or plea has never been made before. Reading between the lines, we can suspect that a serious supply shortage is looming if more oil does not find its way to market soon. [International Energy Agency Urges Oil Producers to Lift Output](http://www.nytimes.com/2011/05/20/business/global/20oil.html?hpw) May 19, 2011 PARIS — Expressing “serious concern” about elevated crude prices, the International Energy Agency on Thursday called for an increase in world oil production. It was an unusual move that highlighted consumer countries’ frustration at the failure of oil-producing nations to lift output in the face of rising demand and tighter supply. (...) The agency’s monthly Oil Market Report, respected by industry practitioners, has recently been warning about tightening market conditions as supply has not caught up with strong demand. Despite commitments from Saudi Arabia, the biggest producer, to use its spare capacity to increase output and replace the supplies lost because of the uprising in Libya, the cartel’s production is now running 1.3 million barrels a day below the level seen before the crisis, according to the I.E.A. Although the New York Times has positioned this unusual call by the IEA as perhaps a bit of political maneuvering, I feel they missed the real picture by not spending more time characterizing the mismatch between supply and demand. If that's true, then we have a near-perfect repeat of the 2008 situation, where, in the six quarters preceding the oil price spike, demand exceeded supply in five of those quarters. Confirming this view recently was Goldman Sachs' energy division, which said: While near-term downside risk remains as the oil market negotiates the slowdown in the pace of world economic growth, we believe that the market will continue to tighten to critical levels by 2012, pushing oil prices substantially higher to restrain demand. Events in the Middle East and North Africa are having a persistent impact, which leads us to increase our oil price targets. We expect that the ongoing loss of Libyan production and disappointing non-OPEC production will continue to tighten the oil market to critically tight levels in early 2012, with rising industry cost pressures likely to be felt this year. We are now embedding in our forecasts that Libyan production losses will lead to the effective exhaustion of OPEC spare capacity by early 2012. Consequently, we are raising our Brent crude oil price forecast to $115/bbl, $120/bbl, and $130/bbl on a 3, 6, and 12 month horizon. ([Source](http://www.zerohedge.com/article/well-was-quick-goldman-goes-long-crude-raises-12-month-brent-forecast-130bbl)) There’s a lot in there, including the idea that the unrest in the Middle East will be persistent, that non-OPEC production will continue to disappoint (which it should, as nearly every non-OPEC country is past peak), and that the more globally relevant Brent contract is the right one to quote now when discussing oil, not the US-centric WTIC contract. So count Goldman Sachs among those that are now calculating an imminent supply-demand mismatch. The End of Easy Oil The really big news is that the Wall Street Journal finally ran an oil piece (on the front page, no less) acknowledging the difficulties involved in Saudi Arabia regarding oil production and the extraordinary efforts that are now underway to boost production by unlocking their remaining heavy oil reserves. The critical parts in this story revolve around the costs of getting this oil out of the ground (in terms of both energy and money), the decades it will take to get the oil out, and the clear implication that going after such oil tells us everything we need to know about where we are in the Peak Oil story in general (and specifically in Saudi Arabia). All the better, easier, cheaper grades are already drilled and in production. This is what's left: WAFRA, Kuwait—The Arabian Peninsula has fueled the global economy with oil for five decades. How long it can continue to do so hinges on projects like one unfolding here in the desert sands along the Saudi Arabia-Kuwait border. Saudi Arabia became the world's top oil producer by tapping its vast reserves of easy-to-drill, high-quality light oil. But as demand for energy grows and fields of "easy oil" around the world start to dry up, the Saudis are turning to a much tougher source: the billions of barrels of heavy oil trapped beneath the desert. Heavy oil, which can be as thick as molasses, is harder to get out of the ground than light oil and costs more to refine into gasoline. Nevertheless, Saudi Arabia and Kuwait have embarked on an ambitious experiment to coax it out of the Wafra oil field, located in a sparsely populated expanse of desert shared by the two nations. That the Saudis are even considering such a project shows how difficult and costly it is becoming to slake the world's thirst for oil. It also suggests that even the Saudis may not be able to boost production quickly in the future if demand rises unexpectedly. Neither issue bodes well for the return of cheap oil over the long term. The whole story is worth a read. I’ve excerpted quite a bit because there’s so much important information in there that I wanted you to see. Most importantly, the mainstream media in the US is finally waking up to the idea that all of the cheap and easy oil is gone. They’ve not yet gotten to the appreciation of the idea of Net Energy, which is the real key to understanding why the future will not resemble the past, but they are edging ever closer. And they are beginning to circle around the idea that depletion in the fields that have driven the world’s economy for the past 50 years is a critical reality. It’s not much of a hop, skip, and a jump from there to seeing it finally named for what it is: Peak Oil, otherwise known as the geological reality that will resist all efforts at human ingenuity and technology because it is a matter of finite limits, not of willpower or optimism. One thing I thought the article did an especially good job of was actually delving into the engineering realities involved in the project. The article continues: The Wafra project, however, is far more of a challenge than traditional steam projects. As in most of the Middle East, the oil at Wafra is trapped in a thick layer of limestone that also contains minerals that can build up inside pipes and corrode equipment. An even bigger challenge is getting the two crucial elements for generating steam: water and a source of energy to boil it. Most successful steam projects are in places with easy access to relatively pure water and a cheap fuel source, usually natural gas. Saudi Arabia and Kuwait have little of either. With no fresh-water sources in the Arabian desert, Chevron has been forced to use salt water found in the same underground reservoirs as the oil. That water is full of contaminants that must be removed before it can be boiled and injected into the ground. Finding the energy to boil the water will be even tougher. Chevron could use oil instead of natural gas—literally burning oil to produce oil—but that would burn profits, too. So the company likely will be forced to import natural gas from overseas, an expensive process that involves chilling it to turn it into a liquid, then shipping it thousands of miles. Some experts are shaking their heads. The hurdles include mineral buildups, corrosion, water impurities, and the energy costs of heating all that water into steam. In short, getting this stuff out of the ground is going to be far more difficult and costly than prior efforts. End of story. The reality involved in getting at the non-conventional oil is really just a story of declining net energy; the red curtain will extend down into the luscious green space that represents the surplus energy available to society. Less net energy means less economic activity and complexity. It means less growth. Below a certain level, it means no growth at all. And eventually it means persistent negative growth, a possibility not yet priced into any financial markets. In some cases I have my concerns about whether these heroic efforts are worth the trouble at all. Perhaps we should invest the same amount of energy, talent, and expertise in energy conservation efforts and technological development. At this point in the timeline, it's imperative for each of us to ask ourselves: how well prepared are we for this post-Peak Oil future? [Part II of this report: How To Position for the Next Oil Shock](http://www.chrismartenson.com/martensonreport/how-position-next-oil-shock?utm_source=businessinsider&utm_medium=syndication&utm_content=link1&utm_campaign=58360" \t "_blank) explores the probable impact the next energy crisis will have on key asset classes, employment, and society in general. As we've shown above, we likely have little time left. Use it wisely.

## AT: Dept. of Commerce CP

### Military is a pre-requisite, key to protecting all supply lines

Eggers 8 \*Jeffrey Eggers is a commander in the United States Armed Forces [<http://www.armedforcesjournal.com/2008/05/3434573>, May 2008, Armed Forces Journal, “The Fuel gauge of national security]

At first glance, the military’s slice of demand may not be the intuitive place to focus effort. The military’s use of oil constitutes about 2 percent of total U.S. oil consumption, or about the same as a major U.S. airline. And if there is one sector of consumption where we should gladly pay a premium for high-octane liquid fuel, it is our national security apparatus. So it is fair to argue that attention is best placed on the civilian side of usage, where 98 percent of demand lies. There are many near-term solutions that promise to make a dent in this 98 percent, on the demand and supply sides. Plug-in hybrids, sustainable bio-fuels, broad-based conservation efforts and general “greenness” are gaining considerable political traction. But none offers a long-term silver bullet, and each has limitations. In addition to pulling consumption toward “ready” technologies, work must be done in parallel to advance high-risk and transformative solutions. And one of the most successful models for doing so is the military wing of research and development. Focusing on the 2 percent of military consumption is important not only because it safeguards the flow, and mitigates risk, to the 98 percent. The exploration of new sources of energy for our military fighting machinery will directly sustain future defense readiness and buttress military power and, more significantly, will indirectly catalyze a revolution in civilian transportation technology and innovation.

# \*India Extensions

## Relations – Momentum / Resiliency Key

### New projects are key to resiliency

Blake 6-10 **–** Assistant Secretary, Bureau of South and Central Asian Affairs

(Robert, “US/India: Bilateral Relations Since the Obama-Singh Summit,” <http://www.scoop.co.nz/stories/WO1106/S00229/usindia-bilateral-relations-since-the-obama-singh-summit.htm>, dml)

The global strategic partnership between the United States and India is founded on shared values and exceptional people-to-people ties. But we must remember that this is a long-term project. Neither country can take the relationship for granted. We need to work together to ensure that the spirit of President Obama and Prime Minister Singh's November 2009 summit is carried forward through concrete steps. Such achievements will build the political support in Washington and Delhi, as well as Mumbai and Manhattan, to think more ambitiously about what we can achieve, and where our partnership will go in the rest of the 21st century. India is on track to have the largest population on the planet by 2030, and might have the largest economy by 2050. India is a rising giant whose influence is being felt not only in the Indian Ocean, but in the Americas, in Africa, the Middle East, and in Central Asia. Its rise – fueled by a young, optimistic, dynamic, educated population – will be one of the great stories of our time. Our strategic relationship can make the world more secure and democratic, while our commercial partnerships can produce novel products that meet the needs of the 21st century consumer and create millions of new jobs in each of our countries. Our people, our businesses, our diverse, intertwined knowledge-based societies will support the next chapter of the U.S.-India partnership. Once again I want to thank the Members of the India Caucus for their staunch support of this growing partnership. Thank you very much for your time. I’d be honored to take your questions.

### Relations are at a cross-road – new cooperation is key

Das 11 – Premvir, former Director General, Defence Planning Staff, and member of the National Security Advisory Board (May 1, 2011 <http://www.business-standard.com/india/news/premvir-das-indo-us-engagement-atcrossroads/434038/> AMB)

For more substance to be given to the relationship, a larger overview of national interest is needed. If a multipolar Asia is what India wants and a unipolar continent is what China seeks, then the US becomes a very important factor in our calculus. Its interests in Asia are enormous and it cannot let China assume a hegemonic role. Without ‘using’ the US, it is not possible for India to secure the Asia that it wants. On another plane, none of its global aspirations can be met without the proactive support of the US — seats in the Security Council, on the high table of world trade, in groups controlling nuclear technology or in several other multilateral forums, fall in this category. The real question is whether a close engagement impacts adversely our relations with other countries — for example, Russia, Iran and Myanmar, even China, our core interests in South Asia and, indeed our concerns vis-a-vis Pakistan. These cannot be easily brushed aside but close scrutiny will show that while all these are manageable by us, the larger canvas is not. In sum, close relations with the US are critical to India’s rise, first as an Asian power and then as a global player of consequence. If this is true, then defence cooperation between the two countries must be taken a few notches further. Its contours can be four-fold. One, the existing military interfaces and acquisitions should be progressed apace, even if an American company does not get the contract for 126 aircraft for the Air Force, as seems likely; there will be more military procurements on line. Two, both countries should be in sync on India’s interests in the Indian Ocean region and act in a manner that will sustain them; a permanent Chinese naval presence, possible only through base facilities in littorals, acts to the detriment of this position. Three, maritime forces of both countries must act together in the campaign against piracy in the Indian Ocean. Finally, India must be prepared to render military assistance in ‘out of area’ contingencies; on its part, the US must take punitive measures against acts of terrorism against India originating, even sponsored, from Pakistan. We are at a crossroads. If we take the right road, defence cooperation will gather momentum and to our advantage. If not, it will soon run out of steam, to our detriment.

## Link – Relations

### It’s the heart of relations

[Garretson](http://www.idsa.in/sites/default/files/OP_SkysNoLimit.pdf) 10– Lt Col, on the Board of Directors of the National Space Society

(Peter, “Sky’s No Limit: Space-Based Solar Power, the Next Major Step in the Indo-US Strategic Partnership?,” <http://www.idsa.in/sites/default/files/OP_SkysNoLimit.pdf>, dml)

In fact, Inderfurth and Mohan’s well-timed piece arguing that space should be put at the heart of US-India relations as it can literally “lift relations to a higher orbit”, seemed to find a strong echo in the SinghObama Joint Statement, which within a broader context of assuring each other (and answering concerns of neglect ) that their fundamental strategic goals were convergent under the new administrations, said, “They agreed to collaborate in the application of their space technology and related capabilities in outer space and for development purposes.”

## Impact – Warming

### Solve warming

Asia Task Force 9– task force analyzing policy situations in Asia

(“Delivering on the Promise: Advancing US Relations with India, <http://asiasociety.org/files/pdf/DeliveryOnThePromise_USRelationsWithIndia.pdf>, dml)

Reducing emissions will entail shifting away from fossil fuels, using resources more sparingly, learning to produce less waste, and sequestering and storing carbon. The scientific R&D capabilities of India and America, along with our venture capitalists, will lead on innovation. The US and India have an interest in a vibrant and reciprocal partnership that addresses energy innovation, the expansion of solar, wind, and other renewable power industries, and a means to reduce emissions affordably. As the United States seeks solutions for its auto-centric transportation system, the example set by some Indian cities—such as Delhi, which has mandated that public transportation vehicles use clean compressed natural gas—offers lessons on how to quickly replace gasoline.

## Impact – AIDs

### Solve AIDs

Asia Task Force 9– task force analyzing policy situations in Asia

(“Delivering on the Promise: Advancing US Relations with India, <http://asiasociety.org/files/pdf/DeliveryOnThePromise_USRelationsWithIndia.pdf>, dml)

If there is a humanitarian issue on which the world seems in general agreement, it might be the scale of devastation from HIV/AIDs, and the urgent need for a solution. It has reached its most severe form in sub-Saharan Africa, where the average life expectancy has plummeted to 47 years. The US and Indian governments are both engaged with the issue but via separate mechanisms; similarly the US and Indian private sectors are contributing to bring treatment to Africa and elsewhere through foundation initiatives and tiered pricing structures. But we have no identifiable US-India initiative that focuses our great strengths in the many areas relevant to this problem, such as scientific innovation, public health, and prevention programs. What if we were to work together in a concerted effort to channel and apply such initiatives in Africa where the impact has become catastrophic, as well as in India and the US? By working together on a humanitarian crisis important to us both, and on an issue where we have little disagreement, we could realize the great potential of our cooperation. We could apply our countries’ minds to the HIV/AIDS crises on multiple fronts in Africa—seeking to assist with treatment, public health policy, care for orphans, and other humanitarian concerns—as well as the pressing matters in our own countries which could benefit from our work together.

## Impact – Proliferation

Relations are key to prevent the spread of proliferation and instability throughout Asia

Burns 5

Nicholas, Under Secretary for Political Affairs, Congressional Testimony before the House International Relations Committee, “The U.S. and India: An Emerging Entente?” September 8, <http://www.nti.org/e_research/official_docs/dos/dos090805.pdf>

A strong democratic India is an important partner for the United States. We anticipate that India will play an increasingly important leadership role in 21st century Asia, working with us to promote democracy, economic growth, stability and peace in that vital region. By cooperating with India now, we accelerate the arrival of the benefits that India's rise brings to the region and the world. By fostering ever-closer bilateral ties, we also eliminate any possibility that our two nations might overlook their natural affinities and enter into another period of unproductive estrangement, as was so often the case in the past half century. Today, for the first time since bilateral relations were established in 1947, the United States and India are bound together by a strong congruence of interests, values, and a large and successful Indian-American community. Consequently we find an especially receptive partner in New Delhi, one no longer bound by Cold War politics or dogma. The Indian Government has demonstrated its firm desire to enhance our bilateral relationship. The United States now has a window of opportunity to seize the initiative with India, to build bonds and habits of cooperation that will stand the test of time. It is incumbent upon us, therefore, to undertake ambitious actions that correct our mutual history with India of missed opportunities and advance our common interests in the century ahead. We seek to work with India to win the global War on Terrorism, prevent the spread of weapons of mass destruction, enhance peace and stability in Asia, protect trade routes and sea lines of communication, and advance the spread of democracy. India and the United States now find ourselves on the same side on all of these critical strategic objectives. Our challenge, then, is to translate our converging interests into shared goals and compatible strategies designed to achieve those aims. In this context, the wide range of initiatives agreed to by President Bush and Prime Minister Manmohan Singh this July, including our agreement to promote civilian nuclear energy cooperation, represents a unique chance to build trust between the United States and India because of the resonance all these programs have for both countries.

## Impact – Indo-Pak War

### Solves indo-pak war

Perkovich 10– vice president for studies and director of the Nuclear Policy Program at the Carnegie Endowment for International Peace

(George, “Toward Realistic US-India Relations,” [http://www.carnegieendowment.org/files/realistic\_us\_India\_relations.pdf](http://www.carnegieendowment.org/files/realistic_us_india_relations.pdf), dml)

Therefore the United States and India share an interest in devising a mixture of inducements and pressures to persuade the power centers in Pakistan to cooperate in rooting out sources of violent extremism. The United States can reasonably ask New Delhi to understand that Washington will seek a lasting positive relationship with Pakistan. Criticizing U.S. leaders for words and deeds that do not always and exclusively favor India over Pakistan is neither realistic nor wise. The United States and India would also augment the prospects for Indo–Pak stability by avoiding military sales that Pakistan could reasonably find provocative. Encouraging Indo–Pak dialogue on how to stabilize their competition in subconventional, conventional, and nuclear capabilities is necessary. Kashmir is a challenge that the United States can neither avoid nor resolve. India has the power to rebuff unwelcome U.S. involvement. Successive American administrations have recognized this. Washington can do more than it typically has to hold the Pakistani military and the ISI to pledges that they will not abet violent actors in Kashmir. At a minimum, the United States should expose Pakistan publicly whenever it fails to act to prevent infiltrations across the Line of Control, shut down jihadi training operations, or arrest leaders of organizations that foment attacks on India. But Indian leaders must also do more to correct the misgovernance and human rights abuses that are remobilizing Muslims in the Kashmir Valley. Indians may reasonably expect the United States to heed their demand not to try to mediate the Kashmir issue with Pakistan, but they should not expect it to stay silent about large-scale Indian human rights violations or other policies that undermine conflict resolution there. The United States has legitimate strategic interests in urging both India and Pakistan to explore all prospects for normalizing Indo–Pak relations and reducing the threat of violent extremism in South Asia and elsewhere.

## Impact – China

Relations are key to counterbalance China

Krauthammer 11/12/10

Charles, a nationally syndicated columnist, “Why Obama Is Right about India”, November 12, [http://www.nationalreview.com/articles/253121/why-obama-right-about-India-charles-krauthammer#](http://www.nationalreview.com/articles/253121/why-obama-right-about-india-charles-krauthammer)

The visit to India was particularly necessary in the light of Obama’s bumbling over-enthusiasm in his 2009 trip to China, in which he lavished much time, energy, and praise upon his hosts and then oddly tried to elevate Beijing to a G-2 partnership, a kind of two-nation world condominium. Worse, however, was Obama’s suggesting a Chinese role in South Asia — an affront to India’s autonomy and regional dominance, and a signal of U.S. acquiescence to Chinese hegemony. This hegemony is the growing source of tension in Asia today. Modern China is the Germany of a century ago — a rising, expanding, have-not power seeking its place in the sun. The story of the first half of the 20th century was Europe’s attempt to manage Germany’s rise. We know how that turned out. The story of the next half-century will be how Asia accommodates and/or contains China’s expansion. Nor is this some far-off concern. China’s aggressive territorial claims on resource-rich waters claimed by Vietnam, Brunei, Malaysia, the Philippines, and Japan are already roiling the neighborhood. Traditionally, Japan has been the major regional counterbalance. But an aging, shrinking Japan cannot sustain that role. Symbolic of the dramatic shift in power balance between once-poor China and once-dominant Japan was the resolution of their recent maritime crisis. Japan had detained a Chinese captain in a territorial-waters dispute. China imposed an embargo on rare-earth minerals. Japan capitulated. That makes the traditional U.S. role as offshore balancer all the more important. China’s neighbors, from South Korea all the way around to India, are in need of U.S. support of their own efforts at resisting Chinese dominion. And of all these countries, India, which has fought a border war with China, is the most natural anchor for such a U.S. partnership. It’s not just our inherent affinities — democratic, English-speaking, free-market, dedicated to the rule of law. It is also the coincidence of our strategic imperatives: We both face the threat of radical Islam and the longer-term challenge of a rising China. Which is why Obama’s dramatic call for India to be made a permanent member of the Security Council was so important. However useless and obsolete the U.N. may be, a Security Council seat carries totemic significance. It would elevate India, while helping bind it to us as our most strategic and organic Third World ally. China is no enemy, but it remains troublingly adversarial. Which is why India must be the center of our Asian diplomacy. And why Obama’s trip — coconuts and all — was worth every penny.

Lack of relations torches our ability to contain China.

Kaplan 10

Robert D. Kaplan, the author of “Monsoon: The Indian Ocean and the Future of American Power,” is a senior fellow at the Center for a New American Security and a correspondent for The Atlantic, Op-Ed Contributor, New York Times, “Obama Takes Asia by Sea,” November 11, 2010, http://www.nytimes.com/2010/11/12/opinion/12kaplan.html?\_r=1

Gone today are the artificial divisions of cold-war-era studies: now the “Middle East,” “South Asia,” “Southeast Asia” and “East Asia” are part of a single organic continuum. In geopolitical terms, the president’s visits in all four countries are about one challenge: the rise of China on land and sea. India is increasingly feeling hemmed in by China’s military might. It lies within the arc of operations of Chinese fighter jets based in Tibet. China is building or developing large ports in Pakistan, Bangladesh, Sri Lanka and Burma, and providing all these Indian Ocean countries with significant military and economic aid. Although India and China fought a border war in the early 1960s, they have never really been rivals, separated as they are by the Himalayas. But the shrinkage of distance thanks to globalism and advances of military technology has spawned a rivalry that is defining the new Eurasia. Indeed, it is India’s emergence as a great Eurasian power that constitutes the best piece of news for American strategists since the end of the cold war. Merely by rising without any formal alliance with Washington, democratic India balances statist China. Even closer links between the United States and India would be better — and no doubt factored into Mr. Obama’s talk of backing India for a seat on the United Nations Security Council — but are made complex by our chaotic land wars. While President Obama would like to withdraw from Afghanistan, Indian leaders remain afraid he will do precisely that. To Indians, Afghanistan is not a distant Central Asian country: it is historically part of the subcontinent. Empires as distant as the Harappans in the fourth millennium B.C. and as recent as the Mughals in the early modern era made Afghanistan, Pakistan and northern India part of the same polity. Indian elites carry this history in their bones. India wants a relatively benign and non-fundamentalist Afghanistan as a way of limiting Pakistan’s influence in the region. (That’s why India supported the Soviet-puppet Afghan leaders in the 1980s against the C.I.A.-backed mujahedeen.) Were the United States to withdraw precipitously, India would understandably look to Iran, Russia and perhaps China as allies in a tacit effort to contain Pakistan. Thus we could lose the prospect of a de facto pro-American India to balance the military and economic rise of China.

## Impact – Democracy/Stability

US-Indo relations are key to global democracy and Asian stability

Nicholas 7

R., U.S. Under Secretary of State for Political Affairs, “America's Strategic Opportunity With India”, Foreign Affairs, Nov/Dec,[http://www.foreignaffairs.org/20071101faessay86609/r-nicholas-burns/america-s-strategic-opportunity-with-India.html](http://www.foreignaffairs.org/20071101faessay86609/r-nicholas-burns/america-s-strategic-opportunity-with-india.html)

As we Americans consider our future role in the world, the rise of a democratic and increasingly powerful India represents a singularly positive opportunity to advance our global interests. There is a tremendous strategic upside to our growing engagement with India. That is why building a close U.S.-India partnership should be one of the United States' highest priorities for the future. It is a unique opportunity with real promise for the global balance of power. We share an abundance of political, economic, and military interests with India today. Our open societies face similar threats from terrorism and organized crime. Our market-based economies embrace trade and commerce as engines of prosperity. Our peoples value education and a strong work ethic. We share an attachment to democracy and individual rights founded on an instinctive mistrust of authoritarianism. And in an age of anti-Americanism, according to the most recent Pew Global Attitudes survey, nearly six in ten Indians view the United States favorably. In the past decade, both President Bill Clinton and President George W. Bush recognized this opportunity and acted to construct a completely new foundation for U.S. ties with India. Our relationship with India now is our fastest-developing friendship with any major country in the world. I have visited India eight times in the last two years to help construct this partnership. I have seen firsthand the remarkable growth in trust between the leaderships of the two countries. I have also observed the corresponding explosion in private-sector ties, the greatest strength in the relationship. The progress between the United States and India has been remarkable: a new and historic agreement on civil nuclear energy, closer collaboration on scientific and technological innovation, burgeoning trade and commercial links, common efforts to stabilize South Asia, and a growing U.S.-India campaign to promote stable, well-governed democracies around the world. And the United States is only just beginning to realize the benefits of this relationship for its interests in South and East Asia.

## AT: Relations=China Containment

### Relations don’t guarantee containment – rational actors wouldn’t risk it

Perkovich 10– vice president for studies and director of the Nuclear Policy Program at the Carnegie Endowment for International Peace

(George, “Toward Realistic US-India Relations,” [http://www.carnegieendowment.org/files/realistic\_us\_India\_relations.pdf](http://www.carnegieendowment.org/files/realistic_us_india_relations.pdf), dml)

The United States should continue to emphatically support India’s efforts to prosper, secure itself, and gain international influence. Democratic India’s success will be an achievement of unprecedented scale and complexity, and it will benefit not only Indians but the entire world. Yet a U.S.–Indian partnership should not be conceptualized as a means to contain or contest China—a notion that many self-proclaimed realists in America and India wish to project onto the relationship. The United States should appreciate India’s intrinsic importance more fully. To conceive of India as a balance against China instrumentalizes it. India is nobody’s tool, and as a large, developing country it shares many interests with China. Sometimes India and China will stand together in opposition to the United States, as with climate change and World Trade Organization negotiations. More often than not, New Delhi will pursue a more cooperative approach with Beijing than China-balancers in the United States would wish. India knows it will always live next to China and does not have the luxury to pursue ideologically and rhetorically heated policies toward it.

## AT: NPT CP

### India will never sign it

Johnson-Freese 11 – professor of national security affairs at the Naval War College

(Joan, “The US-India Space Partnership: Who Gets What?”, May 17, [http://www.worldpoliticsreview.com/articles/8839/the-u-s-India-space-partnership-who-gets-what?page=1](http://www.worldpoliticsreview.com/articles/8839/the-u-s-india-space-partnership-who-gets-what?page=1), dml)

Why would the Indians do something so potentially counterproductive, at a time when the country seems poised for increasingly rapid economic and technological development? First and foremost is something that might be called the "Nuclear Non-Proliferation Treaty (NPT) Syndrome." Indians are adamant that India will never sign the NPT, which it considers highly discriminatory. Like many developing nations, India has long seen the NPT as a Cold War artifact meant to cement the nuclear supremacy of Moscow and Washington. Further, they are also quite upset about being held accountable to a treaty that they never signed. As a result, New Delhi is adamant that it will never sign the NPT, because by doing so, it would confirm India's status as an inferior nuclear "have not," rather than an equal member of the rule-making circle of major nuclear powers. That perspective has been imposed on considerations about space. The Indians seem to believe in the inevitability of space war. Consequently, since China, the U.S. and Russia have tested ASATs, India feels compelled to do so as well, so that if some sort of international agreement is made to ban future ASAT tests, India will this time be on the "haves" side of history. If so, their strategy could be to develop the capability, while declaring it if and when such a step seems warranted. The Indians are also taking the same approach as other highly developed military powers, for whom fighting major wars has become too costly and war itself functionally obsolete. Instead, India wants the ability possessed by other nations to win wars in what they call the "escalatory phase," which would supposedly serve as a deterrent to any attack on India. Against what or whom an ASAT deterrent is aimed, however, is not clear. Clearly, India lives in a rough neighborhood. It is surrounded by Russia, Pakistan and China, three nuclear-armed states, and it has already fought wars with two of them. Indian security concerns are both real and understandable. The U.S., for its part, has complicated but generally friendly relationships with all the countries in the region, no doubt a stance that occasionally is the source of irritation or even concern to India. The Indians, surveying this geopolitical landscape, accordingly make the argument that they have "no choice" but to pursue space capability options that include militarization. That logic, however, precludes alternatives from even being considered, a particularly ironic problem since there is also a drumbeat of Indian rhetoric about how the United States, and not India, is locked in an outdated Cold War mindset that precludes Washington from recognizing the eventual, and some would argue inevitable, eclipse of the United States by rising Eastern powers.

## AT: H-1B CP – India Brain Drain disad

### Causes India brain drain

Desai et al 9– Chair of Doctoral Programs at the Harvard Business School

(Mihir, with Devesh Kapur, Associate Professor for the Study of Contemporary India, and John McHale and Keith Rogers, Queens University of Ontario, “The fiscal impact of high-skilled emigration: Flows of Indians to the US,” Journal of Development Economics 88 (2009) 32–34, Elsevier, dml)

The importance of H-1Bs as driver of high-skilled emigration from India is highlighted by the following facts. First, while the share of H-1Bs going to Indians was stable at around 20% in the first have of the 1990s, the share rose steadily to reach 49% in fiscal year 2001 (Desai et al., 2004; Kapur and McHale, 2005). Second, in fiscal year 2001 almost 162,000 H-1B petitions were approved for Indians (Kapur and McHale, 2005). Third, more than 98% of approved petitions went to workers with a bachelor's degree or better, with more than 40% having a graduate degree. Finally, almost 60% of approved petitions were in technicallydemanding, computer-related occupations. There is also evidence from the sending side that Indian emigrants to the U.S. are not drawn randomly from the population of graduates, let alone the population at large. Studies of the graduates of the Indian Institutes of Technology provide a good illustration. The acceptance rate in these institutes is between 1 and 2% from a pool that is already highly selective. An analysis of the “brain-drain” of the graduates of IIT Mumbai in the 1970s revealed that 31% of its graduates of IIT settled abroad while the estimated migration rate of engineers more generally was 7.3%. 25 Furthermore, the migration was significantly higher in those branches of engineering with higher ranked entrants to IIT: thus the percentage abroad in electrical engineering was nearly 43%, while in metallurgical engineering it was about 20%. Similarly, while the percent abroad was 43% in the top quartile of the graduating class it was 27% in the rest of the class. The selection bias in emigration from India also exists in other disciplines. In medicine, while migration rates for doctors was about 3% during the 1980s, it was 56% for graduates of the All India Institute for Medical Sciences—India's most prestigious medical training establishments—between 1956–80, and 49% in the 1990s. 26 And in management training, a recent analysis of graduates of India's premier management school in February 2000 found that the typical recruit in the international sector has a CGPA (cumulative grade point average) that is significantly higher than his counterpart in the domestic sector (See Bhattacharjee, Krishna and Karve, 2001).

### Kills the Indian economy

Desai et al 9– Chair of Doctoral Programs at the Harvard Business School

(Mihir, with Devesh Kapur, Associate Professor for the Study of Contemporary India, and John McHale and Keith Rogers, Queens University of Ontario, “The fiscal impact of high-skilled emigration: Flows of Indians to the US,” Journal of Development Economics 88 (2009) 32–34, Elsevier, dml)

Human capital outflows of this magnitude will influence a developing country in myriad ways—many beneficial. A prosperous diaspora can be a source and facilitator of trade, investment and ideas; a rich vein of remittances; and a potential stock of high human capital returnee emigrants. However, losing a substantial fraction of its “best and brightest” may have substantial negative effects on a country as well. The loss of skilled workers may harm cooperating factors—complementary skilled workers, less-skilled workers, entrepreneurs, and capital providers. The outflow of talent may also make the country less attractive as a destination for foreign direct investment and may stunt the development the needed critical mass for successful high technology clusters. This outflow may also have deeply inimical consequences on a country's institutions, particularly universities, thereby affecting its long-term development. 2 This paper emphasizes one additional dimension of these human capital flows for developing countries and, specifically, the Indian economy—the direct fiscal impact of losing a key component of the tax base. Given their human capital characteristics, U.S. resident Indians would typically have been substantial net contributors to the Indian tax base if they had not emigrated. Thus, their absence imposes a fiscal burden of higher taxes and lower spending on “those left behind” (TLBs). 3 The implication of the “brain drain” for fiscal policies is the subject of a large theoretical literature (see, for example, the papers collected in Bhagwati and Wilson (1989)). The major focus of this literature is the implications of international labor mobility on the ex ante design of fiscal policy, typically in an optimal taxation framework.

## ---Indo-Pak Scenario

### That causes Indo-Pak conflict

Mamoon & Murshed, 10 – Professor the Birmingham Business School, University of Birmingham & Centre for the Study of Civil War, PRIO, Norway  
[Dawood & Mansoob, “The conflict mitigating effects of trade in the India-Pakistan case” Econ Gov, 11:145, 2010,<http://www.springerlink.com/content/4736rl34w118q532/fulltext.pdf>]

However, if India is able to export or import more, this would at least put a check on any rise in the severity of conﬂict and hostilities would adjust to some average level. Any decline in Indian trade will enhance hostilities. The current low levels of bilateral trade between Pakistan and India is conﬂict enhancing, so more trade with increased exports by both sides to each other should be encouraged. More access to Pakistani markets on the Indian side may not lead to conﬂict mitigation if Pakistan is not able to also export more to India. A rise in education expenditure puts a check on hostilities, as seen in Graph 1e. Graph 1f is the standard representation of India-Pakistan conﬂict, and not only best ﬁts historical trends but also explain the rationale behind recent IndiaPakistan peace initiatives with decreasing hostilities when not only India but Pakistan also has had economic growth rates as high as 7% per annum. The forecasts suggest that conﬂict will rise, even if there is a significant increase in combined democracy scores, if growth rates plummet. Both Pakistan and India have seen many such years, when hostilities between both countries rose significantly when at least one of the countries is performing poorly, but were channeling more resources on the military as a proportion of their GDPs. The forecasts favour the economic version over the democratic version of the liberal peace. Thus one may look at current peace talks between both countries with optimism as both are performing well on the economic front and channeling fewer resources on the military as a proportion of national income, while at the same time having a divergent set of political institutions, though recently Pakistan has edged towards greater democracy with elections in February 2008.

### Causes terrorist acquisition of Pakistani loose nukes

Dawn.com 11– Pakistani news website, written by Anwar Iqbal, Executive Director of the Automobile Division of Raja Group

(“Tension with India fuels nuclear risks, US Senate told,” <http://www.dawn.com/2011/05/27/tension-with-india-fuels-nuclear-risks-us-senate-told.html>, dml)

**WASHINGTON:** An escalation in tensions between India and Pakistan can allow extremists to seize nuclear arms because Islamabad mates its weapons with the delivery system only during a crisis**, the US Senate was told.** In the US, the attack on a naval complex in Karachi has reignited the debate about extremists seizing Pakistan’s nuclear weapons. Pakistan says that its nuclear weapons are well-secured and dismisses media speculations of a terrorist takeover as baseless. On Thursday, a Taliban spokesman told the Wall Street Journal that the group had no plans to attack Pakistan’s nuclear arsenal. “Pakistan is the only Muslim nuclear-power state,” Ehsanullah Ehsan said in a telephone interview, adding that the Taliban had no intention of changing that fact. Senator Richard Lugar, the senior Republican on the Senate Foreign Relations Committee, however, noted that in one of the tapes discovered from Osama bin Laden’s compound in the May 2 raid, the Al Qaeda leader told his followers that the acquisition of nuclear and chemical weapons was a religious duty. “This effort has not died with Bin Laden,” the senator warned. He noted that Pakistan’s military leaders had given repeated assurances that “the country’s rapidly expanding nuclear arsenal” was well-secured. “But we also know that the A.Q. Khan network was enabled by members of Pakistan’s nuclear establishment. And further, if Pakistan succumbs to violent extremism or economic collapse, confidence in the security of Pakistan’s nuclear arsenal and technology could erode rapidly,” the senator said. But instead of using this argument to browbeat Pakistan, Senator Lugar argued that the threat “underscores the importance to US national security of a stable Pakistan and of continued engagement on terrorism and nuclear-security issues”. The Republican senator, who co-authored the aid to Pakistan bill with Senator John Kerry, asked US experts who testified before the Senate panel to explain how to address this threat. “Is there a way of handling this without boots on the ground term tens of thousands?” he asked. Dr Christine C. Fair of the Georgetown University explained that during their peacetime deployments, the warheads were not assembled and they’re not mated in the delivery systems. “But as the conflict with India begins to escalate, they begin mating the warheads, and they begin mating them and forward-deploying them with their delivery assets, and that’s when command and control becomes very murky,” she said. “So if I were a terrorist, and I understood how the Pakistani security establishment deals with nuclear weapons, that’s when I would try to do something nefarious.” She also claimed that in the 1980s, Pakistan’s former army chief, Aslam Beg, “deliberately tried to proliferate to Iran to undermine our security interests, we cannot rule out the possibility that the Pakistani state would deliberately do that.” Dr Fair also claimed that Pakistan used the nuclear umbrella to protect terrorist groups like Lashkar-e-Taiba. “If it weren’t for those nuclear weapons, Pakistan would have been sorted out with far less complexity. It’s their nuclear umbrella that they use their militant groups safely.” Senator Ben Cardin, a Democrat, noted that “Pakistan is critically important for many reasons, not the least of which its nuclear capacity”. “Pakistan is a unique country … we are constantly having to make tradeoffs with Pakistan. Our only long-term hope, quite frankly, is that we can continue to provide investments that will allow the civilians over time period to take control of security governance,” Dr Fair responded.

### Nuclear war

Pitt, 9- a New York Times and internationally bestselling author of two books: "War on Iraq: What Team Bush Doesn't Want You to Know" and "The Greatest Sedition Is Silence."

(5/8/09, William, “Unstable Pakistan Threatens the World,” http://www.arabamericannews.com/news/index.php?mod=article&cat=commentary&article=2183)

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But a suicide bomber in Pakistan rammed a car packed with explosives into a jeep filled with troops today, killing five and wounding as many as 21, including several children who were waiting for a ride to school. Residents of the region where the attack took place are fleeing in terror as gunfire rings out around them, and government forces have been unable to quell the violence. Two regional government officials were beheaded by militants in retaliation for the killing of other militants by government forces. As familiar as this sounds, it did not take place where we have come to expect such terrible events. This, unfortunately, is a whole new ballgame. It is part of another conflict that is brewing, one which puts what is happening in Iraq and Afghanistan in deep shade, and which represents a grave and growing threat to us all. Pakistan is now trembling on the edge of violent chaos, and is doing so with nuclear weapons in its hip pocket, right in the middle of one of the most dangerous neighborhoods in the world.The situation in brief: Pakistan for years has been a nation in turmoil, run by a shaky government supported by a corrupted system, dominated by a blatantly criminal security service, and threatened by a large fundamentalist Islamic population with deep ties to the Taliban in Afghanistan. All this is piled atop an ongoing standoff with neighboring India that has been the center of political gravity in the region for more than half a century. The fact that Pakistan, and India, and Russia, and China all possess nuclear weapons and share the same space means any ongoing or escalating violence over there has the real potential to crack open the very gates of Hell itself. Recently, the Taliban made a military push into the northwest Pakistani region around the Swat Valley. According to a recent Reuters report: The (Pakistani) army deployed troops in Swat in October 2007 and used artillery and gunship helicopters to reassert control. But insecurity mounted after a civilian government came to power last year and tried to reach a negotiated settlement. A peace accord fell apart in May 2008. After that, hundreds — including soldiers, militants and civilians — died in battles. Militants unleashed a reign of terror, killing and beheading politicians, singers, soldiers and opponents. They banned female education and destroyed nearly 200 girls' schools. About 1,200 people were killed since late 2007 and 250,000 to 500,000 fled, leaving the militants in virtual control. Pakistan offered on February 16 to introduce Islamic law in the Swat valley and neighboring areas in a bid to take the steam out of the insurgency. The militants announced an indefinite cease-fire after the army said it was halting operations in the region. President Asif Ali Zardari signed a regulation imposing sharia in the area last month. But the Taliban refused to give up their guns and pushed into Buner and another district adjacent to Swat, intent on spreading their rule. The United States, already embroiled in a war against Taliban forces in Afghanistan, must now face the possibility that **Pakistan could collapse** under the mounting threat of Taliban forces there. Military and diplomatic advisers to President Obama, uncertain how best to proceed, now face one of the great nightmare scenarios of our time. "Recent militant gains in Pakistan," reported The New York Times on Monday, "have so alarmed the White House that the national security adviser, Gen. James L. Jones, described the situation as 'one of the very most serious problems we face.'" "Security was deteriorating rapidly," reported The Washington Post on Monday, "particularly in the mountains along the Afghan border that harbor al-Qaeda and the Taliban, intelligence chiefs reported, and there were signs that those groups were working with indigenous extremists in Pakistan's populous Punjabi heartland. The Pakistani government was mired in political bickering. The army, still fixated on its historical adversary India, remained ill-equipped and unwilling to throw its full weight into the counterinsurgency fight. But despite the threat the intelligence conveyed, Obama has only limited options for dealing with it. Anti-American feeling in Pakistan is high, and a U.S. combat presence is prohibited. The United States is fighting Pakistan-based extremists by proxy, through an army over which it has little control, in alliance with a government in which it has little confidence." It is believed Pakistan is currently in possession of between 60 and 100 nuclear weapons. Because Pakistan's stability is threatened by the wide swath of its population that shares ethnic, cultural and religious connections to the fundamentalist Islamic populace of Afghanistan, fears over what could happen to those nuclear weapons if the Pakistani government collapses are very real. "As the insurgency of the Taliban and Al Qaeda spreads in Pakistan," reported the Times last week, "senior American officials say they are increasingly concerned about new vulnerabilities for Pakistan's nuclear arsenal, including the potential for militants to snatch a weapon in transport or to insert sympathizers into laboratories or fuel-production facilities. In public, the administration has only hinted at those concerns, repeating the formulation that the Bush administration used: that it has faith in the Pakistani Army. But that cooperation, according to officials who would not speak for attribution because of the sensitivity surrounding the exchanges between Washington and Islamabad, has been sharply limited when the subject has turned to the vulnerabilities in the Pakistani nuclear infrastructure." "The prospect of turmoil in Pakistan sends shivers up the spinesof those U.S. officials charged with keeping tabs on foreign nuclear weapons," reported Time Magazine last month. "Pakistan is thought to possess about 100 — the U.S. isn't sure of the total, and may not know where all of them are. Still, if Pakistan collapses, the U.S. military is primed to enter the country and secure as many of those weapons as it can, according to U.S. officials. Pakistani officials insist their personnel safeguards are stringent, but a sleeper cell could cause big trouble, U.S. officials say." In other words, a shaky Pakistan spells trouble for everyone, especially if America loses the footrace to secure those weapons in the event of the worst-case scenario. If Pakistani militants ever succeed in toppling the government, several very dangerous events could happen at once. Nuclear-armed India could be galvanized into military action of some kind, as could nuclear-armed China or nuclear-armed Russia. If the Pakistani government does fall, and all those Pakistani nukes are not immediately accounted for and secured, the specter (or reality) of loose nukes falling into the hands of terrorist organizations could place the **entire world on a collision course with unimaginable disaster**. We have all been paying a great deal of attention to Iraq and Afghanistan, and rightly so. The developing situation in Pakistan, however, needs to be placed immediately on the front burner. The Obama administration appears to be gravely serious about addressing the situation. So should we all.

## ---Indo-Sino-Pak Scenario

### A strong Indian economy is key to avoiding conflict with Pakistan and China

Boozman, 8

John, NATO Parliamentary Assembly; Petras Austrevicius, ‘The Rise of the Indian Economy: Transatlantic and Global Implications,’ Spring, http://www.naa.be/Default.asp?SHORTCUT=1472

A changing global order and rapid Indian growth have fostered conditions for India to redefine its place in the region and in the world. No longer mired in economic stasis, India comes to the diplomatic table buoyed by its ever more formidable economic presence. This alone endows it with a kind of weight that demands other great powers pay it close attention.  That this wealth is being generated in the world economy is consequential. India now holds a greater stake in the global trading and financial systems. India's foreign policy has undergone a profound transformation since 1991 that has more or less paralleled its economic transition. India's relations with the United States and Europe were not well developed in the post-war period, partly due to its inward looking development strategy, its socialist economic organization, its special relationship with Russia and its role in the non-aligned movement.  India's relations with China and Pakistan were also tense and, at times, overtly hostile.  45.  Indian relations with the United States, Pakistan, China and Russia have evolved substantially over the last decade. The collapse of the Soviet Union, the end of Cold War rivalry, and the apparent failure of Soviet-style economic planning all compelled Indian leaders to revamp the country's international posture. India began to buy into the economic principles for which the West stood, and this, almost by default, pointed a way toward improved relations with the United States in particular, but also with Europe. 46.  India clearly has welcomed the international community's efforts to help ease tensions in its immediate neighbourhood. Pakistan's domestic turmoil and its historic rivalry with India, particularly over Kashmir, the rise of religious extremism in the region, Afghanistan's ongoing crisis, civil war in Sri Lanka, and tensions in Nepal are all flash points with varying implications for Indian security. Yet, India is increasingly making use of a plethora of bilateral and multilateral channels to ease tension and is far better positioned than it was during the Cold War to work towards this end with other great powers including the United States and China.

### The impact is global nuclear war

Malik 3

Mohan, Professor of Security Studies at the Asia-Pacific Center for Security Studies, ‘ The China Factor in the India-Pakistan Conflict,' Parameters, Spring, pg. proquest

One Chinese national security analyst argues that “what worries China more is the possibility that it could be drawn into a conflict, not between Pakistan and India per se, but between Pakistan and the United States, with the latter using India as a surrogate.”48 With the top al Qaeda and Taliban leadership fleeing into Pakistan’s Wild West and Pakistani-held Kashmir, Beijing knows full well that Pakistan is no longer the “frontline state” in the war on terrorism that it once was; it is, in fact, the battlefield in the war on terror.49 Should the India-Pakistani conflict escalate into a nuclear one, neither the geopolitical nor the radioactive fallout will remain limited to South Asia. Indeed, the most worrisome scenario would be one where Pakistan is losing a conventional conflict and uses tactical nuclear weapons in a desperate effort to win or to salvage a face-saving defeat that would allow the regime to survive. (The risk-taking nature of the Pakistani military leadership suggests that such a scenario cannot be completely ruled out.) Should India respond by launching strategic nuclear strikes resulting in the complete destruction of the Pakistani state, China would find it difficult to sit idly by.   The next India-Pakistan war also could bring the United States and Pakistan on a collision course, with or without India acting as a US partner. Such a development would obviously present China with difficult choices. Open support for its closest ally would jeopardize China’s relations with the United States and India. But nonintervention on Pakistan’s behalf could encourage India to solve “the Pakistan problem” once and for all, with or without a nuclear exchange, and thereby tilt the regional balance of power decisively in its favor. As Zhang Xiaodong put it: “There is the real possibility that a new Indian-Pakistani war will take place in the future. This war would be disastrous, as it would change  the whole political balance in Central and South Asia," which is currently tilted in China's favor.50 Unrestrained Indian power could eventually threaten China's security along its soft underbelly-Tibet and Xinjiang.

### The war would be devastating – ensures nuclear conflict and the destruction of international security

Perkovich, 2

George, Senior Associate Carnegie, ‘India and Pakistan on the Brink,’ The Wall Street Journal, May 29, http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=1023

Nuclear war is a real prospect in South Asia; to prevent it, the U.S. must relentlessly press and encourage Gen. Musharraf to act decisively against jihadi organizations and rogue elements in Pakistan's intelligence service. These elements threaten the future of Pakistan, the Indian subcontinent, and the U.S. campaign against terrorism. The stakes are so high that the uppermost levels of the U.S. government need to clarify that the war on terrorism in Kashmir is its top priority in relations with Pakistan. The South Asian crisis has many causes. The most recent are a series of terrorist attacks by pro-Kashmir militants against Indian institutions and civilians. Last Oct. 1, militants attacked the Kashmir legislative assembly in Srinigar, followed on Dec. 13 by a bloody assault on the Indian parliament in New Delhi. On May 15, three reported Pakistanis killed 34 people, mostly women and children related to army personnel in Jammu, in southern Kashmir. Some 700,000 Indian military personnel stand ready to retaliate and "teach Pakistan a lesson" for sponsoring terrorism as soon as the order is given. Pakistan counters that the violence arises unavoidably and indigenously from frustration and outrage over India's occupation of the Kashmir valley. Gen. Musharraf disclaims Pakistani involvement in the latest incidents, and insists that the end to violence will come only when India engages Pakistan in a dialogue to resolve the conflicting interests and perspectives of India, Pakistan and the Kashmiri people. Gen. Musharraf may be right that the latest terrorist attacks are aimed at him as well as India. But his government's failure to extirpate groups that infiltrate across the Kashmir divide exposes either duplicity or weakness on his own part. Yes, India's failure to offer decent governance to the Kashmiris created the current mess and makes New Delhi's self-righteousness difficult to swallow. Still, this does not excuse Pakistan's support of terrorist groups and tactics. Washington is implicated in this fray because its understandable obsession with hunting down al Qaeda operatives in Pakistan has left it reluctant to exert severe pressure on Pakistan to combat terrorism in Kashmir. Gen. Musharraf and others believe that their cooperation in the hunt for the remnants of al Qaeda will protect Pakistan from suspension of new American aid. Indian officials seethe over apparent U.S. willingness to trade battlefield success against al Qaeda for India's security from Pakistan-backed terrorism. Seeing an American double standard, New Delhi wants to rebuff U.S. pleas for Indian restraint. The American stakes in preventing Indo-Pak war are enormous. Every U.S. government war game involving India and Pakistan has resulted in escalation to nuclear exchanges. Indians and Pakistanis dismiss these outcomes as American folly, but neither side offers any reason to think that it would accept defeat rather than risk escalating the conflict. The world's first nuclear war could not only cause horrendous death and destruction but also jeopardize an international security order created largely by the U.S. Pakistan would opt out of the war against al Qaeda. Since even a short-term Pakistani victory would merely be a prelude for Indian revenge, Pakistan's attention and resources would focus on India, not al Qaeda. And a war that resulted in a Pakistani defeat of any sort would render Pakistan physically or politically incapable of assisting the U.S. against al Qaeda. American relations with India would plunge. President Bush has stated that he seeks to "transform" the U.S.-Indian relationship because India is a rising global power, a leading democracy, a growing market and home to nearly two million high-achieving Indian-Americans. If India were to suffer in a war with Pakistan, Indians would blame the U.S. for "allowing" Pakistan to create the conditions for war.

## AT: H-1B CP – Links to politics

### Links to politics

Celeste and Mitra 9 – \*president of Colorado College, a special advisor to the U.S.-India Business Council, former ambassador to India) AND \*\*Secretary General of the Federation of Indian Chambers of Commerce and Industry, Phd in Economics from Duke

(Richard and Amit, “CHARTING NEW FRONTIERS: Enhancing India-U.S. Cooperation in the Global Innovation Economy,” Report of the Joint Task Force of the Pacific Council on International Policy and the Federation of Indian Chambers of Commerce & Industry, June, http://www.pacificcouncil.org/document.doc?id=34)

While immigration policy (including the H-1B visa process) is a hotly-contentious issue, the United States would benefit greatly from ending the self-imposed limits on its access to the global pool of skilled workers. As with other aspects of globalization, this proposition is difficult to sell politically, all the more so in the midst of a severe economic recession. The H-1B visa restrictions contained in President Obama’s economic stimulus plan likely foreshadow broader efforts to limit temporary visa programs in the coming months. Given the political headwinds, efforts by U.S. technology companies to increase the entire H-1B quota may well have to wait for more economically-propitious times. At a minimum, however, Washington policymakers should push ahead with a proposal, advanced by Mr. Obama during the presidential campaign, to create a “fast track” mechanism allowing foreign students with advanced technical degrees from U.S. universities to receive an employment-based visa. A sizeable increase in the annual quota for such students should also be enacted. By giving these individuals (and their spouses, who are often professionals in their own right) the legal right to work in the country for a substantial period of time, the ranks of America’s high-skill workforce would be fortified and talented foreign students would have an even stronger incentive to pursue advanced studies in the United States.69’70

### More evidence

Preston and Bajaj 6/21– both correspondents for the New York Times

(Julia and Vikas, “Indian Company Under Scrutiny Over US Visas, <http://www.nytimes.com/2011/06/22/us/22infosys.html>, dml)

The Infosys inquiry coincides with a broader attack in Congress on longer-term visas, known as H-1B, that Infosys and other Indian companies rely on to bring Indian technology workers to the United States. With unemployment for Americans stubbornly high, lawmakers have become increasingly reluctant to defend H-1B visas, which give temporary residence to highly skilled foreigners. In recent years, the top companies receiving those visas were not American names, but Infosys and another big Indian outsourcing company, Wipro.

## AT: India Co-op CPs

### They don’t solve the ASATs scenario – that’s predicated on US-India space cooperation

### This means CP doesn’t solve – Indian ASATs jack all international credibility and makes the case a disad

Listner 11 **–** legal and policy analyst with a focus on issues relating to space law and policy

(Michael, “India’s ABM test: a validated ASAT capability or a paper tiger?,” <http://www.thespacereview.com/article/1807/1>, dml)

An attempt to perform such a test unilaterally without consulting the international community could result in serious international repercussions and could even affect its burgeoning relations with the United States in terms of space cooperation.14 Although China avoided serious international repercussions from its ASAT test in 2007, it is unlikely that India would enjoy similar immunity and could find itself at the center of a serious political and diplomatic tempest, a fact that India’s officials are likely aware of.15 India would also have to consider what a unilateral test could do to its credibility in the international circle with relation to orbital debris mitigation. India is a member of the Inter-Agency Space Debris Coordination Committee (IADC), and it contributed significantly to crafting that organizations mitigation guidelines. A successful test of an ASAT by India and the resulting debris field could seriously erode it credibility in that arena. There is also a possibility that an ASAT test could inadvertently spark an international crisis with China. The resulting debris from an ASAT test could contaminate a large orbital area and potentially create a hazard to Chinese satellites. Regardless of the debris produced by an ASAT test, China might consider such a test as a provocative action.

## AT: Space Weapons

### Turn – cooperation key to check Sino-India war, ASATs, and debris

O’Donnell 11– Researcher at the James Martin Center for Nonproliferation Studies

(Frank, “India’s Space Ascent Gains New Boost,” <http://www.offnews.info/verArticulo.php?contenidoID=30856>, dml)

Sino-Indian strategic competition threatens to extend to rival anti-satellite (ASAT) programs, intended to eliminate or disable adversary satellites and so deny access to space-based services including communications, navigation, surveillance, and targeting. China conducted an ASAT physical interdiction test in 2007, destroying a weather satellite with an SC-19 missile and generating substantial amounts of long-lived space debris. An SC-19 also served as the interceptor in a Chinese ballistic missile defense [test](http://gsn.nti.org/gsn/nw_20110310_1171.php) in 2010, illustrating an emerging dual role for China's "hit-to-kill" rocket program. The most recent US annual [estimate](http://www.defense.gov/pubs/pdfs/2010_CMPR_Final.pdf) of Chinese military capabilities notes the existence of programs for the development of additional ASAT tools including particle beam, laser and high-energy microwave options. New Delhi is also seeking to develop ASAT technology, as illuminated by a "Technology Perspective and Capability Roadmap" published by the Ministry of Defense in 2010. In its overview of defense technology development plans, the report included "development of ASATs for electronic or physical destruction of satellites in both LEO (low earth orbit) and geo-synchronous orbits", along with additional measures to harden satellites against potential attack. Furthermore, following a successful missile interception test in March, the chief of the Indian Defense Research and Development Organization highlighted advances in India's ballistic missile defense program with regard to their potential contributions to ASAT capabilities. While Beijing should remain the principal focus of US efforts to restrain anti-satellite technology competition, US diplomats should also seek to engage their Indian counterparts on this topic. This approach would support the goal, outlined in the US National Security Space Strategy , of a "safe space environment in which all can operate with minimal risk of accidents, breakups, and purposeful interference." More broadly, Washington should aim to encourage a regional consensus opposing the utilization of "hit-to-kill" technologies against satellites, an area of potential competition; it is also one which poses risks to all states with satellites in orbit: the resulting debris cannot be directed away from neutral or "friendly" equipment. This initiative could branch into discussions of alternative ASAT options, including targeted beams, jamming or the maneuvering of one satellite into another, with the aims of reducing the role of ASAT technologies in regional military strategies and raising the political costs of their development and use. In particular, such an engagement strategy would encourage a Sino-Indian understanding of shared risks and responsibilities regarding the protection of space assets, while providing a basis for broader efforts to manage their strategic competition. The relaxation of export controls by the US has opened up the possibility for close cooperation in advancing India's space exploration and commercial launch campaigns. As new collaboration initiatives expand the range of bilateral space discussions, US diplomats should seek to encourage India away from the targeting of satellites by "hit-to-kill" technologies. This point should also serve as a central theme for dialogue with China, and impressed as a core American expectation of responsible behavior among its global space-faring partners. As India continues its space rise, this opportunity to advance crucial space security objectives should not be squandered.

## AT: T-its

### 1. we meet – 1AC Dinerman indicates cooperation occurs through allowing Indian scientists into America – means all development occurs through us

### 2. c/i – its means associated with

**Oxford Dictionaries Online, No Date** (“Its”, <http://oxforddictionaries.com/definition/its?view=uk>)

its

Entry from World dictionary

Pronunciation:/ɪts/

possessive determiner

belonging to or associated with a thing previously mentioned or easily identified: turn the camera on its side

he chose the area for its atmosphere

### 3. prefer our interp – first offense

### a) education – SPS is at the core of the topic – if it’s true coop is normal means then they limit out key topic education

### b) ground – they limit out 80% of affs on the topic

Giffords 9 (Gabrielle, Arizonan Democratic Representative, Chairwoman, Subcommittee on Space and Aeronautics, Committee on Science and Technology, “Decisions on the Future Direction and Funding for Nasa: What Will They Mean for the U.S. Aerospace Workforce and Industrial Base?” prepared opening statement at a Hearing before the Committee on Science and Technology, House of Representatives

December 10, 2009 pgs. 17-18. <http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg54449/pdf/CHRG-111hhrg54449.pdf> ps)

Contracts with the commercial sector account for more than 80 percent of NASA’s budget. Those contracts encompass work done by large established aerospace firms, work done by emerging companies that offer the promise of new capabilities to meet the agency’s needs, and products and services provided to NASA by non-aerospace companies both large and small. Given that, it is clear that support for NASA is also support for the commercial sector and for the jobs that sector creates and the innovations that it makes possible.

Next defense

a) no ground loss – we can’t spike out of disads through india cooperation

b) no multi-actor fiat – we have evidence proving india would come to the table

c) lit checks – there’s a huge debate over international cooperation

Not a voter –

a) Reasonability – our interpretation is we’re reasonably topical if there’s no in-round abuse – solves fairness

b) Competing interpretations bad – leads to an arbitrary race of who can limit out one more aff

c) Potential abuse bad – it’s voting us down for arguments we didn’t make – evaluate the round based on what happens

## AT: ASPEC

### Specification bad – no lit base

NSSO 7 **–** report by the National Security Space Office, a branch of the DOD

(“Space-Based Solar Power As an Opportunity for Strategic Security,” <http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf>, dml)

Lacking a specific mandate and clear responsibility, no U.S. federal agency has an existing or planned program of research, technology investment, or development related to Space‐Based Solar Power. Instead, the responsibilities for various aspects of SBSP are distributed among various federal agencies.

# \*\*\*Mechanics\*\*\*

## Inherency – Not Cost Competitive

### Not cost competitive yet

Johnson et al 9 – NASA Physicist

Les Johnson, NASA Physicist, 2009, Matloff, PhD in Applied Science @ NYU, C Bangs, Artist, Paradise Regained: The Regreening of the Earth, pg. 114-115

Yes, there is always a catch. This virtually limitless, completely renewable, continuous power system **will be expensive** to develop and launch into space. The launch requirements alone, at today's prices, are astronomical (pun intended). A 4-gigawatt (GW) (4-billion-watt) power station would weigh in excess of 2 million kilograms and require perhaps twenty launches of NASA'S planned Ares-II rocket just to get the construction materials into space. Then it would have to be assembled, probably requiring humans since no matter how capable our robots may be, there is no substitute for having a person at the site in case something goes wrong. At today's prices, the launch costs alone could exceed $20 billion. (But with trillions of dollars being used in 2009 to bail out the world's financial institutions, this seems like a worthwhile and affordable investment!) Then there are the rest of the infrastructure costs. How much will it cost to build that spacecraft and solar arrays, the antennae, and the ground support equipment? These costs could easily total in the billions of dollars. For lack of detailed accounting analysis, let's say this infrastructure cost is on the order of half the launch cost, placing the total system price at approximately $30 billion. For comparison, using today's dollars, a coal-fired power plant would cost "only" hundreds of millions of dollars. Space-based solar power is clearly not cost competitive—yet. Improvements in solar array efficiency seem to be occurring on a regular basis. As of this writing, inventors are claiming efficiencies greater man 35 percent. Previous studies of space solar power assumed much lower efficiency solar cells, therefore requiring many more cells to produce the same amount of power as higher-efficiency ones. With these cells, the amount of mass to be carried to space will decline, resulting in a decline in the launch cost But it would have to decline dramatically to make a significant difference in the estimated multibillion-dollar cost. What can possibly make this affordable? Well, that all depends on the cost of energy and how much of a value we place on the environment. The cost of energy production is not as simple as dollars, euros, or yen. What is the cost to the planet of the strip mining required for the coal we burn in our thousands of power plants? What is the payoff in reduced defense spending that will result from us not having to depend on the volatile Middle East for oil to generate electrical power? How much is it worth to eliminate the acid rain associated with the burning of fossil fuels? What benefits will we reap from a power system mat produces no greenhouse gases? The authors contend that when the real societal costs are considered, as well as the real monetary cost from end to end, space-based solar power begins to look like a winner. It is an expensive winner, but a good investment nonetheless.

## Inherency – AT: Demonstrations Now

### Status quo demonstrations and approaches are insufficient – an influx of funding, support and a demonstration are necessary

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

A variety of tests and demonstrations of one key SPS technology – wireless power transmission – have been performed since the 1960s. Many of these tests have involved component technologies that are not directly relevant to validating the economic viability of SSP. Moreover, selected early demonstrations have been performed by various organizations almost as a means of “getting their feet wet” – i.e., in learning the basics of WPT and/or SPS. Unfortunately, the next steps in moving higher in the TRL scale require **considerably greater funding** (i.e., from the lower left to the upper right in the roadmap); these key steps have not yet been taken. Timely communication of plans and results from SPS technology **R&D activities is crucial to coordinated progress**. The ongoing Power Symposium, organized annually under the auspices of the International Astronautical Federation (IAF), has served a highly useful role in this regard. Similarly, periodic conferences dedicated to SPS and WPT have been held over the past 20+ years in various countries (e.g., WPT 1995, SPS 2004, etc.); these have been highly useful in promoting international dialog and coordination of SSP efforts. As noted above, it was the consensus of the IAA study group that SSP systems are technically feasible. However, the successful development of the SPS concept – and the determination of markets might be served economically – cannot be accomplished without investments in systemslevel, end-to-end studies, ground and flight demonstrations at higher TRL levels, and eventually the launch of **major sub-scale SPS pilot plant demonstrations**.

### \*TRL = Technology Readiness Level

## Inherency – Current Private Approach Fails

### Private approaches are doomed to failure – too much up-front capital required

Preble 10 – MS in Physics and System Management

Darel Preble, MS in Physics and System Management, consulting positions with Booz Allen Hamilton, Digicon and the United States Forces Command, 12-2010, “The Sunsat Act - Transforming our Energy, Economy and Environment,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/preble.html

**No company, utility or agency** today is prepared to assume the immense business risk involved in creating and launching a space solar power system. The tens of billions in financing required and the painfully slow payback time places SSP in the venture capital "Valley of Death." There are still too many engineering, financial, and regulatory risks. Like building or financing the Hoover Dam or the Transcontinental Railroad, **private enterprise will need** some **help** bringing this much needed public utility to operational reality. Expecting an individual utility to construct an untested new power source is probably illegal. Since utilities are public trusts, they would not likely engage in the high-risk work necessary to build the first sunsats. Similarly, requiring utilities to reduce their CO2 footprint would be fruitless unless there is a trustworthy path forward. Wind mills and ground solar, for example, cannot be expected to replace baseload coal and nuclear power plants, which have to be scheduled. Only Congress imagines they can schedule wind or sun. There is also no economic way to store massive quantities of electric power; i.e., California can't be run on "batteries" charged from wind power. To expect it to do so would force its utilities to either destabilize their grid or to greatly increase costs to their customer base. SSP provides a real alternative to cut costs and improve reliability with its unexcelled power generation characteristics, but such an innovation must be scheduled. No one builds a multi-billion dollar nuclear plant or other baseload plant without being certain of having a customer base. That is why deregulation of energy utilities was such a hoax on the American people. In a deregulated environment new generation capacity and new transmission lines can not be built because the return of the principal and interest can not be assured.[16] To do so would place more debt on the public for needed services than would ever be acceptable. Major electric power utilities are the most capital intensive businesses in the world, meaning they require more dollars to be invested in concrete and steel to earn a dollar that any other business. Companies in several countries are pursuing SSP, including China, Europe and the United States. In the U.S., Solaren has a contract approved by the California PUC, to provide its PG&E utility with 200 megawatts of space solar power starting in 2016. In a press release, PG&E said the price would exceed 12.9 cents a kilowatt-hour.[17] Note that PG&E has invested nothing and accepted no risk. Solaren is planning for $100 million in first round financing. Expecting private companies to build SSP alone is problematic. Solaren will need to raise ten to forty billion in financing.

## Inherency – AT: Private Investment Now

### Private investment is insufficient – cost and tech barriers

Brown 9 – Masters in Science

Trevor, MSc from Nanyang Technological University, 2009, “SSP: a spherical architecture,” The Space Review, http://www.thespacereview.com/article/1383/1

Space solar power (SSP) is gradually beginning to take flight. Enterprising SSP ventures, such as Solaren Corp. and Space Energy, Inc., are in the midst of developing initial projects to supply energy from space. Solaren Corp. of California has recently reached an agreement with Pacific Gas and Electric, a California utility, to supply 200 megawatts of energy beginning in 2016, while Space Energy, Inc., a Swiss based company, is producing a prototype demonstration satellite that will help it close purchase power agreements with entities it is currently in discussions with. But while these pioneering companies in the vanguard of a nascent industry are surmounting many technical and economic obstacles, **significant barriers remain** before the dissemination of energy from space can become truly widespread. As SSP advocates are painfully aware, the high expense of launching numerous payloads into space for the assembly of satellites large enough to transmit meaningful amounts of energy to Earth is cost prohibitive. While very large structures in space are theoretically within the realm of the technically possible for legitimate SSP interests, the launch costs associated with the construction of a satellite a few kilometers in length, as would be necessary for large scale energy transmission, are exorbitant. Additionally, the expense of space systems and operations—robotic technologies and the supporting space and Earth-based infrastructure—are extremely high and must be dramatically reduced. While proponents hope that large-scale space infrastructure projects will achieve certain economies of scale that will bring down the cost of each individual launch, component, and support system, the prevailing price tag for the whole of such a project would doubtless be enormous, **making it very difficult to compete** in the broader energy marketplace.

## Inherency – AT: Japan / EU

### Japan and EU don’t solve demonstration

Shiner 8

Linda Shiner, 2008, “Where the Sun Does Shine,” Air Space Magazine, http://www.airspacemag.com/space-exploration/Sun\_Does\_Shine.html?c=y&page=1

Not that the field of space robotics isn’t advancing. Robots that may someday build large structures in orbit might look like Roby Space Junior, a spiderbot created by an institute at the Vienna University of Technology (famous in Europe for creating a tiny robot soccer team). The four-inch-square Roby was designed to crawl on a vast web-like structure called a Furoshiki spacecraft, a lightweight mesh that could form the platform for large antennas, sails—or solar collectors. In 2006, the European and Japanese space agencies joined forces to launch a 65- by 130-foot Furoshiki web and three spiderbots on a sounding rocket that produced a few minutes of weightlessness. The net deployed, and the robots crawled on it for a few seconds. The experiment seems typical of recent work on space solar power: ingenious, but a long way from tackling the huge challenges that space power systems face. The Japanese and European space agencies are funding research, but as of today, **there is no credible project** to build systems that will demonstrate all the necessary elements working together.

## Solvency – Up-Front Investment

### \*\*\*This evidence is comparative with DoD procurement\*\*\*

### Up-front USFG investment is the only want to incentivize private sector development – procurement or prize strategies alone fail

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:   The SBSP Study Group found that industry has stated that the #1 driver and requirement for generating industry interest and investment in developing the initial operational SBSP systems is acquiring an anchor tenant customer, or customers, that are willing to sign contracts for high‐value SBSP services. Industry is particularly interested in the possibility that the DoD might be willing to pay for SBSP services delivered to the warfighter in forward bases in amounts of 5‐50 MWe continuous, at a price of $1 or more per kilowatt‐hour. o Recommendation: The SBSP Study Group recommends that the DoD should immediately conduct a requirements analysis of underlying long‐term DoD demand for secure, reliable, and mobile energy delivery to the war‐fighter, what the DoD might be willing to pay for a SBSP service delivered to the warfighter and under what terms and conditions, and evaluate the appropriateness and effectiveness of various approaches to signing up as an anchor tenant customer of a commercially‐delivered service, such as the NextView acquisition approach pioneered by the National GeoSpatial‐imaging Agency. FINDING: The SBSP Study Group found that even with the DoD as an anchor tenant customer at a price of $1‐2 per kilowatt hour for 5‐50 megawatts continuous power for the warfighter, when considering the risks of implementing a new unproven space technology and other major business risks, the **business case for SBSP still does not appear to close** in 2007 with current capabilities (primarily launch costs). This study did not have the resources to adequately assess the economic viability of SBSP given current or projected capabilities, and this must be part of any future agenda to further develop this concept. Past investigations of the SBSP concept have indicated that the costs are dominated by costs of installation, which depend on the cost of launch (dollars per kilogram) and assembly and on how light the components can be made (kilograms per kilowatt). Existing launch infrastructure cannot close the business case, and any assessment made based upon new launch vehicles and formats are speculative. Greater clarity and resolution is required to set proper targets for technology development and private capital engagement. Ideally SBSP would want to be cost‐competitive with other baseload suppliers in developing markets which cannot afford to spend a huge portion of their GDP on energy (4c/kWh), and these requirements are extremely stringent, but other niche export markets may provide more relaxed criteria (35c/kWh), and some customers, such as DoD, appear to be spending more than $1/kWh in forward deployed locations. It would be helpful to develop a series of curves which examine technology targets for various markets, in addition to the sensitivities and opportunities for development. Some work by the European Space Agency (ESA) has suggested that in an “apples‐to‐apples” comparison, SBSP may already be competitive with large‐scale terrestrial solar baseload power. A great range of opinions were expressed during the study regarding the near‐term profitability. It is instructive to note that that there are American companies that have or are actively marketed SBSP at home and abroad, while another group feels the technology is sufficiently mature to create a dedicated public‐private partnership based upon the COMSAT model and has authored draft legislation to that effect. The business case is much more likely to close in the near future if the U.S. Government agrees to: o Sign up as an anchor tenant customer, and o **Make appropriate technology investment and risk‐reduction efforts** by the U.S. Government, and o Provide appropriate financial incentives to the SBSP industry that are similar to the significant incentives that Federal and State Governments are providing for private industry investments in other clean and renewable power sources. • **The business case may close in the near future** with appropriate technology investment and risk‐reduction efforts by the U.S. Government, and with appropriate financial incentives to industry. Federal and State Governments are providing significant financial incentives for private industry investments in other clean and renewable power sources. o Recommendation: The SBSP Study Group recommends that in order to reduce risk and to promote development of SBSP, the U.S. Government should **increase and accelerate its investments in the development and demonstration** of key component, subsystem, and system level technologies that will be required for the creation of operational and scalable SBSP systems. Finding: The SBSP Study Group found that a small amount of entry capital by the US Government is likely to **catalyze substantially more investment** by the private sector. This opinion was expressed many times over from energy and aerospace companies alike. Indeed, there is anecdotal evidence that even the activity of this interim study has already provoked significant activity by at least three major aerospace companies. Should the United States put some dollars in for a study or demonstration, it is **likely to catalyze significant amounts of internal research and development**. Study leaders likewise heard that the DoD could have a catalytic role by sponsoring prizes or signaling its willingness to become the anchor customer for the product. These findings are consistent with the findings of the recent President’s Council of Advisors on Science and Technology (PCAST) report which recommended the federal government “expand its role as an early adopter in order to **demonstrate commercial feasibility of advanced energy technologies**.”

### Up-front federal funding and demonstration are key

Foust 08 **–** Jeff, the Space Review editor and publisher, (Jeff ,The Space Review 9/15, http://www.thespacereview.com/article/1210/1)

Such efforts, though, are likely beyond the budgets of the Discovery Channel and other networks (not to mention that doing studies hardly makes for the most scintillating television), requiring funding from other sources, most likely the federal government, which is not currently funding any SSP-related research. A variety of government agencies, Mankins said, could step forward to support this, from the Defense Department to the Energy Department. “The $100 million could come from a variety of places, but the key thing is to have it actually focused on these problems,” he said. “The United States is by far the world’s greatest space power,” said Mark Hopkins, senior vice president of the NSS, “and yet we’re not spending any money in this country on space solar power.” That’s not the case in Europe and Japan, where there is money being spent, if only on a small scale, on SSP. “The situation is ridiculous.” One person working to try and make the case for SSP on Capitol Hill is Paul Rancatore. Earlier this year Rancatore ran for Congress from Florida’s 15th district, in the state’s “Space Coast” region and home to many people who work at the Kennedy Space Center. Rancatore made mention of SSP in his campaign, calling it “an economic generator not seen since the Apollo program” and winning the endorsement of Apollo 11 Buzz Aldrin. However, he lost the Democratic primary last month. Rancatore is now spending time meeting with members of Congress and their staffs, primarily with the House Committee on Energy and Commerce and the Select Committee on Energy Independence and Global Warming, on the issue of SSP. “Energy is probably the biggest issue facing the country as well as the world,” he said, requiring both short- and long-term solutions. SSP, he said, solves three major issues in the US today: employment, particularly in high-technology areas; energy independence; and foreign policy. Right now, Rancatore said he’s working to “educate members about what space-based solar power can do for our country, create that dialogue, and possible create a ‘space-based solar caucus’ within Congress for them to fully understand the ramifications for our country and the world and start get members involved.” In an interview after the press conference, he said he’s met with Congressman Ed Markey (D-MA), who chairs the global warming committee, about this issue. Rancatore said he’s yet to identify a member willing to champion this issue in Congress, but expects to make progress on that front, including establishing the caucus, when a new Congress convenes in January. He added that he’s reached out to the campaigns of John McCain and Barack Obama on this subject as well. Some of that rhetoric being used to win over members of Congress was trotted out at the press conference as well. “The potential of space solar power is so large that, if it works out, it would transform the American economy to a much greater extent than the auto industry did in the early part of the 20th century,” said Hopkins, who added that SSP could allow the US to stop spending hundreds of billions of dollars a year to import energy, some of it from countries unfriendly to the US. That’s the long-term goal, but for now the focus is on near-term incremental progress. “What we think we’ve done is to demonstrate that progress is possible,” Mankins said. “It’s possible in a short time and it’s possible at a reasonable budget.”

## Solvency – D and D 🡺 Private Leapfrog

### US action leads to private sector leap-frogging

Smith 8 – Colonel, PhD Candidate @ Reading in UK

Colonel M.V. Smith, PhD student in the strategic studies program under Professor Colin Gray at the University of Reading in the UK, former Chief of Future Concepts (Dream Works) for the National Security Space Office at the Pentagon, 8-10-2008, “Weaponization, Environmental Risk, and Multinational Approaches,” http://spacesolarpower.wordpress.com/2008/08/10/weaponization-environmental-risk-and-multinational-approaches/

I personally believe that in order to make space-based solar power a reality that business must lead the way. However, **government does have a role**. Governments should conduct some R&D to improve efficiencies inherent to the system, remove bureaucratic barriers, and fund experiments to incrementally buy down some of the risk that business must take on. Examples include increasing the efficiencies of solar cells, lowering the cost and increasing the turnaround rate for launch vehicles, advancing the development of an international space traffic control system, securing the orbital parking slots and frequency allowances for these satellites, and conducting concept demonstrators. It is also my opinion that it is best if commercial companies **take government research** and lead the development effort for space-based solar power, and then own and operate such systems. In the first instance, they partner more broadly and far easier than governments do. Take a Boeing aircraft for example. Nearly 40% of the components on the latest Boeing aircraft are made by Airbus. Conversely, nearly 40% of the components on the latest Airbus aircraft are made by Boeing. That did not take massive government negotiations. Business is international by its very nature. Take a look at the products in your home. They are likely a hodgepodge of gadgets with parts made all over the world and assembled somewhere else. It’s nothing personal, it’s just business. The problem with government leadership is that it often gets personal.

## Solvency – Demonstration Key

### \*\*\*This card will be useful against counterplans that don’t include a demonstration\*\*\*

### No private industry would invest absent demonstration

NSSO 7

National Security Space Office, Report to the Director, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study” October 10, 2007, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

 • The second camp, primarily established private industry, felt that **absent a clear demonstration** of the viability of Space-Based Solar Power, an adequate launch market **would not exist** to justify the expense; however, if the technical viability and markets for SBSP were demonstrated, private industry would respond on its own and the lift problem would take care of itself. • More advanced concepts, such as first-stage magnetic levitation (MAGLEV) followed by rocket, airbreathing/airborne oxygen enrichment, as well as electromagnetic launch, hybrid launch to tethers, and space elevator concepts were also discussed. o *Recommendation: The SBSP Study Group recommends that* *NSSO, NASA, DOC, and other* US Government agencies should engage with industry *(aerospace, energy, space tourism & manufacturing)* to determine industry’s level of desired industry/government cooperation for creating SBSP-enabling spacelift and supporting in-space transportation and logistics infrastructure.

## Solvency – R and D

### Up-front R and D is key

Erb 5 – Doctor of Science in Civil Engineering

Bryan, Canadian Space Agency, “SPACE SOLAR POWER - THE CHALLENGES OF PROMOTING A LONG-TERM OPTION IN AN ENERGY MARKET DRIVEN BY SHORT-TERM CONSIDERATIONS,” Scholar

The time horizon for implementing Space Solar Power will be at least a couple of decades. Current work being carried out in the US by the National Aeronautics and Space Administration (NASA) and in Japan by the Ministry of Economy, Trade and Industry (METI) indicate that demonstrations of space-to-ground transmission of power could come in the current decade and initial commercial power delivery in about 20 years. A significant contribution in terms of global energy would clearly take substantially longer [7]. From the practical viewpoint of the energy industry there is a perfectly understandable need for a payback on research and development (R&D) within a very few years. Thus most current energy R&D focuses on incremental change within present frameworks rather than on radically different approaches. Hence we have a significant mismatch in the time horizon to implement SSP and the practices of the utility industry. The challenge presented by this mismatch can be addressed in two ways: First, governments **will need to underwrite, to a major extent**, the R&D needed to bring the **enabling technologies to maturity**. Governments have traditionally supported R&D efforts as a spur to new economic activity. Examples can be found in the development of rail and air transport systems, computers and, most recently, the internet.

## Solvency – D and D Key

### Only up-front government investment will promote large-scale development – otherwise most of the private sector will remain the sidelines

Komerath 10 – Professor of Aerospace Engineering

Narayanan, 1-4-2010, “The Space Power Grid: Synergy Between Space, Energy and Security Policies,” http://smartech.gatech.edu/bitstream/handle/1853/32263/217-673-1-PB.pdf.txt?sequence=3

At GEO, a satellite revolves around Earth?s axis once every 24 hours. Thus, it appears to be stationary above a point on Earth?s Equator. Concepts from the 1960s[1] called for very large solar-cell arrays to be built in GEO, beaming electric power down as microwaves to large receivers on Earth. Frequencies well below 10 billion cycles per second (10GHz) are generally not absorbed by the atmosphere whether dry or wet, and hence this regime was selected for power transmission. NASA and others have conducted numerous studies on SSP[2-5,10,11,12,13], but always focused on GEObased collector/converter/beaming systems. These choices have two consequences: 1) The cost of launching objects to GEO is on the order of $12000 to $24000 per kilogram. 2) The minimum diameter of the beam is on the order of several kilometers, for this frequency range and distance, regardless of the power transmitted. The result of the studies is always the same: it costs far too much to launch the solar cell arrays and converters to GEO, and to assemble the stations. If the number of ground stations is minimized, the distribution infrastructure becomes enormous. **Only massive government spending** can be visualized as a funding source, and even that is outside the realm of reality. The figure of $300B to first power is dangled in many reports. This was based on the estimate of $100 per pound to low earth orbit, used as advertisement for the Space Shuttle when it was sold to Congress in the 1970s. The reality today is over $14,000 per pound to Low Earth Orbit using the Shuttle, and more to GEO. For these reasons, SSP has remained a dream. We note that the real issue is lack of an evolutionary path to get the SSP system through **initial infrastructure development**, to a critical size where its true potential becomes self-sustaining.

## Solvency – Certainty

### Lack of certainty over incentives prevents investment

Anadon et. al. 10 **– Associate Director of Science, Technology, and Public Policy Program and Director of the Energy Technology Innovation Policy research group; Project Manager of the Energy Research, Development, Demonstration & Deployment Policy Project** at the Harvard Kennedy School and part of Belfer Center for Science and International Affairs

Laura, December 1–2, 2010 “Transforming the Energy Economy: Options for Accelerating the Commercialization of Advanced Energy Technologies” <http://belfercenter.ksg.harvard.edu/files/ETIP_Workshop_Framing_Statement_Dec_2010_2.pdf>

Policy and regulations have a significant impact on almost all aspects of energy technologies. Lack of, or uncertainty about, policy and regulations are a **major barrier** to commercialization. The list below includes some of the uncertainties and factors that are likely to affect the private sector’s willingness or ability to invest in commercialization: • Policy and market uncertainty. The private sector is naturally reluctant to anticipate new policies **when such policies are uncertain**, e.g., carbon pricing or other regulation of carbon emissions. Uncertainty about **whether current policies will remain can also have a detrimental effect** on the incentives, e.g., wind deployment varied substantially as the production tax credit was on-and-off, making it harder for a successful domestic windmill manufacturing industry to thrive. This uncertainty can also extend to markets created by mandates, if there is evidence that the current policy may not be sustainable **in its present form** (e.g., the Renewable Fuel Standard’s requirement for cellulosic ethanol), or that mandates will not materialize (e.g., a Renewable Portfolio Standard or a Clean Energy Portfolio Standard for electricity)

### Investors need a guaranteed plan—European alternative energy market proves

Theunisse\* & Niermeijer\*\* 11—\* Project Manager of RECS International, \*\* Secretary General of RECS International, an association of market players in renewable electricity certificates with 268 members in more than 22 European countries

24 February 2011 RECS International News Brief, Issue #6, p.1

On 31 January 2011, the European Commission published the Communication to the European Parliament and the Council about “Renewable Energy: Progressing towards the 2020 target" (COM/2011/31 final). In this document, the EC gives an overview of the status of renewable energy. Two specific recommendations to Member States are relevant to the RECS International community: 1. "Develop cooperation mechanisms and start integrating renewable energy into the European market”. In this respect, EURELECTRIC points out in its Daily News of 1 February 2011 that “On the one hand the paper states that renewables should be competitive by 2020, but on the other that they will rely on support schemes, ‘for some time to come’. The paper calls for convergence of national schemes and for pan-European trade, but also for feed-in premiums and technology-specific support". 2."Ensure that any reforms of existing national support schemes will **guarantee** the **stability** for investors, avoiding retroactive changes". In a press release, the President of the European Renewable Energy Council (EREC), Mr. Arthouros Zervos, agrees with this focus, stating that “For investment in renewable energy to double, investors need stable European and national frameworks”.

### This risk avoidance is key – otherwise companies won’t invest

AEIC 10 **–** American Energy Innovation Council, consisting of preeminent energy and innovation experts and is staffed jointly by the Bipartisan Policy Center and the ClimateWorks Foundation

June 10, 2010 “A Business Plan for America's Energy Future” p. 12 <http://www.americanenergyinnovation.org/full-report>

Why can’t the private sector solve this problem? The private sector has underinvested in energy innovation, and it cannot achieve these goals alone. There are fundamental differences between energy and most other economic sectors, and these differences limit the ability of the private sector to solve large-scale energy problems **on its own**. First, the high price of inaction highlights the need for the public to invest in better energy options. National security, national economic strength, and the environment are not primary drivers for private sector investments, but they are critical for the health of our country. They merit a public commitment. Second, large-scale deployment of many new energy technologies requires **massive capital expenditures** that are **too risky for private investors**. A new generation of microwave technology might cost $10 million to develop and can be built on existing assembly lines. That risk-reward calculus makes business sense. In contrast, a new electric power source can cost several billion dollars to develop, yet still will carry risk of technology failure or regulatory changes. And the product, electricity, is sold into a generic market that does not differentiate between clean and dirty sources. So that investment does not make sense for most companies. Third, America’s long-term corporate R&D budgets, especially those run by utilities, have been in decline for several decades. Fourth, the turnover in the electrical generation system is very slow. Power plants last 50 years or more and are relatively cheap to run once built, so there is little market for new models. Moreover, patents for replacement technology last only 20 years, so the slow power plant turnover considerably reduces the reward for inventors. Combine these elements and it becomes clear why private sector investments in clean energy technology development have been so small. Once businesses see a market situation that **reduces their technology development** risk and rewards clean energy sources, **they will invest**.

## Solvency – Environment Aff – US Key

### US leadership is the only way to get the international community on board

Hsu 10 – PhD in Engineering

Feng, PhD in Engineering, Former head of the NASA GSFC risk management function, and was the GSFC lead on the NASA-MIT joint project for risk-informed decision-making support on key NASA programs, has over 90 publications and is coauthor of two books and co-chair of several technical committees, 12-2010, “Harnessing the Sun: Embarking on Humanity's Next Giant Leap,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/hsu.html

An major effort led by the U.S. - similar to the 1960s Apollo Project to put a man on the moon - with broad participation from the international community may be what is needed to create, implement and operate a commercial scale SPS system. Please remember, an inherent feature of Solar Power Satellites is their location in earth orbit outside the borders of any individual nation. Their energy will be delivered back to the earth by way of wireless power transmission. WPT applications must be compatible with other uses of the radio frequency spectrum in the affected orbital space. SPS infrastructures must also be launched and delivered into space. International involvement of governments is mandatory for coordinating global treaties and agreements, frequency assignments, satellite locations, space traffic control and other features of space operations to prevent international confrontations. It is imperative that a multi-governmental organization or entity be put in place. For the U.S. - or any single nation - to implement a full-scale SPS project alone will be extremely difficult, if not inconceivable, due to the many political, regulatory and technological reasons stated. However, it is equally important that there be **a lead nation** providing the **necessary leadership** in such a complex and interdependent international effort. The various project elements involving multiple government and industry partnerships must be clearly defined. The United States is a **logical leader** in this area because of the breadth of its technology infrastructure and capability, as well as the magnitude of financial resources available in its industry and financial community. Building, launching and operating a system of Solar Power Satellites in space orbit is going to be a technology and engineering endeavor requiring great human effort and ingenuity. If we can go to the Moon and achieve the splitting of atoms, we can also overcome the inefficiency problems of solar-electric conversion, and we can achieve affordable access to space. We can make Solar Power Satellites a cost competitive source of energy for all of humanity.

### U.S. leadership is vital to attracting private investment – the political commitment is a crucial signal

Moore 2k - MA in energy and resources from the University of California at Berkeley

Taylor, “Renewed Interest in Space Solar Power”, EPRI Journal, 3/22, Factiva

Criswell = director of the Institute for Space Systems Operations at the University of Houston.

David Criswell unabashedly favors a major U.S. and international commitment to develop solar power plants on the moon. "The lunar solar approach could be initiated at a fast pace within the current U.S. expenditures on civilian and defense space activities. Private funding would be attracted after power delivery to Earth at commercial levels, say tens of megawatts, has been demonstrated and the essential legal and political commitments have been made. The United States **must lead the international community** If the economic growth of developing nations can be accelerated by clean, low-cost electricity, then the world potentially can be a much more attractive place for everyone."

## Solvency – AT: Launch Costs – Plan Solves

### Technological advances from SSP will reduce launch costs and they could be put on existing satellites

Schwab 5 – director of the Homeplanet Defense Institute

Martin, Homeplanet Defense: Strategic Thought for a World in Crisis, Ch. 4

There are three key additional factors to keep in mind when considering the economic viability of SSP: 1) Launch costs would drop as demand for large volumes of material to be put into space on a frequent basis for SSP increased. 2) Communications satellites could double for space solar power, thus making SSP more cost-effective. 3) A return to the 1960s-era idea of inflatable structures as the platform for solar collection would reduce weight and therefore launch costs. Deflated solar collectors could be folded into a compact space onboard a spacecraft and, once in orbit, inflated with gas from a pressurized container. This method was used in 1960 with the Echo 1 satellite used to bounce radio waves back to Earth. It was also used in 1996 in the Spartan Inflatable Antenna Experiment where a 14-meter antenna was inflated by a nitrogen gas canister while in orbit. Admittedly, the larger SSP satellites would be more ambitious, but if NASA were instructed to make inflatable space structures a high priority, in addition to SSP in general, the knowledge base to make low mass SPS would evolve rapidly. 161 The space entrepreneur community could likely make SSP economically viable **in the near future** by achieving lower launch costs than traditional military contractors offer now. As with any other satellite launches, the space debris mitigation measures discussed at the end of chapter one would need to be of the highest priority in SSP mission planning.

## Solvency – “Whole USFG Key”

### Leaving out any USFG component allows SSP to fall through the cracks – key to send a signal of certainty to the private sector

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:  The SBSP Study Group found that SBSP development over the past 30 years has made little progress because it “falls between the cracks” of currently‐defined responsibilities of federal bureaucracies, and has lacked an organizational advocate within the US Government. The current bureaucratic lanes are drawn in such a way to exclude the likelihood of SBSP development. NASA’s charter and focus is clearly on robotic and human exploration to execute - 25 - the Moon‐Mars Vision for Space Exploration, and is cognizant that it is not America’s Department of Energy (DOE). DOE rightly recognizes that the hard challenges to SBSP all lie in spacefaring activities such as space access, and space‐to‐Earth power‐beaming, none of which are its core competencies, and would make it dependent upon a space‐capable agency. The Office of Space Commercialization in the Department of Commerce is not sufficiently resourced for this mission, and no dedicated Space Development Agency exists as of yet. DoD has much of the necessary development expertise in‐house, and clearly has a responsibility to look to the long term security of the United States, but it is also not the country’s Department of Energy, and must focus itself on war prevention and warfighting concerns. A similar problem exists in the private sector. US space companies are used to small launch markets with the government as a primary customer and advocate, and do not have a developed business model or speak in a common language with the energy companies. The energy companies have adequate capital and understand their market, but do not understand the aerospace sector. **One requires a demonstrated market,** while **the other requires a demonstrated technical capability**. **Without a trusted agent** to mediate the collaboration and serve as an advocate for supportive policy, progress is likely to be slow. o Recommendation: The SBSP Study Group recommends that the US Government re‐order roles and responsibilities to specify SBSP an development champion; one option might included a dedicated sole‐purpose organization. FINDING: The SBSP Study Group found that no existing U.S. federal agency has a specific mandate to invest in the development of Space‐Based Solar Power. • Lacking a specific mandate and clear responsibility, no U.S. federal agency has an existing or planned program of research, technology investment, or development related to Space‐Based Solar Power. Instead, the responsibilities for various aspects of SBSP are **distributed among various federal agencies**. o Recommendation: The SBSP Study Group recommends that the US Government should **form a SBSP** Partnership **Council that consists of all federal agencies** with responsibilities relevant to successfully developing SBSP. The SBSP Partnership Council must be chaired and led by an existing or newly created single‐purpose civilian federal agency.

## Solvency – NASA

### \*This card has a pretty good US better than any other international actor claim

### NASA can have a pilot-project read within a year

Costa 10 - sociobiologist whose expertise is to spot and explain emerging trends in relationship to human evolution, global markets, and new technologies, the former CEO of Silicon Valley start-up Dazai Advertising, Inc. Costa’s clients included technology giants such as Apple Computer, Hewlett- Packard, Oracle Corporation, 3M, Amdahl, Seibel Systems and General Electric

Rebecca, “Can NASA Save a Struggling America?” Clean Technica, 11/1, <http://cleantechnica.com/2010/11/01/can-nasa-save-struggling-america/>

If we took a moment to rank every government agency in the United States on the basis of tackling complex problems, NASA would have to be at the top of everyone’s list. Thousands of scientists and administrators work every day to successfully bridge the gap between science and the great unknown. But perhaps more important than their ability to leverage science to push the boundaries of human achievement, NASA has proven time and again that they know **how to execute**. Imagine for a moment any other agency being charged with getting a 4.5 million-pound payload into outer space on a regular timetable. Never mind time and again performing these miracles on a budget. But here’s the real kicker. About a decade ago the folks at NASA began worrying that America might be losing its love affair with space exploration. They saw budget cuts looming on the horizon and fewer and fewer cameras were showing up for the next shuttle launch. As the country became worried about more pressing issues such as record unemployment, terrorism, climate change and healthcare, NASA was becoming irrelevant. So the agency started looking around for a little side project. It didn’t take long for NASA to realize that renewable energy was the next big frontier. They were also pretty certain the answer would come from the greatest source of clean energy known to man: the Sun — something the folks at NASA felt they knew a little about. So NASA quietly embarked on a program called “space-based solar.” They were determined to solve, once and for all, the growing need for clean, renewable energy, for the American people and every man, woman and child on the planet. Imagine the impact this would have in terms of clean water, hospitals, infant mortality, education and agriculture in even the most remote villages of the world. The idea behind space-based solar was to install solar cells high above the Earth’s atmosphere where the yield is more intense. The energy would be transmitted in the form of diluted, harmless wavelengths to a small satellite dish attached to the roof of every home and business (think satellite TV dish). No more wires or dams or electrical towers strewn across the desert. No more coal-fired plants or nuclear power facilities. No more solar mattresses affixed to our rooftops. No brown outs, power outages or back-up generators. All of them gone, in an instant. Sounds brilliant. But what would you say if I told you that NASA has this technology today? What if I said that NASA has been banging at the door of the U.S. Department of Energy for over a decade and no one will answer. Every time they get a foot in the door they are chastised for “mission creep” and “overreach.” NASA? Those scientists need to stick to pictures of Mars. Time to sound The Watchman’s Rattle: Wake up, America! As China takes the market for solar and wind technology right out of the hands of the DOE (just ask any venture capital firm specializing in clean tech – the writing is on the wall), NASA stands ready for a new mission: to leap-frog the worldwide hunt for renewable energy by initiating a full-scale space-based solar program. We have the technology, we have the resources, we have the need and the will – now all we need is for the Oval Office to run with it. No country has a space agency more knowledgeable, powerful or successful than NASA and the time has come for the United States to leverage this untapped asset. Forget investing in more nuclear power plants or trying to manufacture solar panels and wind generators more cheaply than China. When you can’t compete nose to nose there’s only one thing left to do: change the playing field. And in this case, **America owns the field.** Space-based solar is alive and well at NASA. According to senior scientists who don’t care to have their 30-year careers at NASA come to an end for spilling the beans, pilot programs could be up an **running within one year**. That’s right, just one year. Compare this to the four to five years it takes for a single new nuclear plant to become operational. America: **stop chasing the market**. **Get busy getting ahead of it.** We have NASA to thank for an opportunity to eclipse every other energy solution here on earth.

## Solvency – AT: Clouds Prevent

### Nope

Binns 7-1

Corey, “SPACE-BASED SOLAR POWER,” Power Engineering, http://www.power-eng.com/news/2011/07/1448632564/space-based-solar-power.html

If beaming power from space sounds disconcerting, the concept is remarkably safe and simple. Satellites outfitted with solar panels would gather the sun's energy 24 hours a day and then convert that energy into an infrared laser beam. The high-efficiency laser would transmit 80 percent of the captured energy to groundbased receivers; one design calls for 60-foot-wide laser beams and 9,700-square-foot groundbased receiving stations. If clouds hinder the beam from traveling though Earth's atmosphere, the satellite could redirect the energy to other satellites or receivers in the network.

## AT: Increase Means Existing

### We meet

Greene 9  
Jasmine Greene, “Solar Power Transmission,” http://www.care2.com/causes/solar-space-station.html#ixzz1QzyMdRhn

The idea of having a space station that beams down solar energy to earth has been a popular topic in many sci-fi communities, but it may not be fiction for much longer. Officials in the US and Japanese government have begun funding research into the creation of real space-based solar power stations.

## AT: Increase Means from Zero

### We meet

Jargan Post 11

Jargan Post 2011, “Space Solar Power can be used during disasters,” http://post.jagran.com/solar-energy-for-emergency-power-supply-1309079712

"This space solar emergency power supply is not "black" by any means. Everything was openly published on the space solar base supply concept in 2007. I know of no secret programs to build such a system," he said. Currently there are no funded programmes supporting Space Solar by any US agency to our knowledge, he said.

## Solvency – AT: Public Opposition Prevents

### Public opposition doesn’t prevent

Coopersmith 9 – Professor of History @ TX A and M

Jonathan Coopersmith, 2009, “An electrifying conference?,” The Space Review, http://www.thespacereview.com/article/1475/1

Fossil fuels such as coal increase global warming, nuclear power is very capital-intensive and still lacks a safe way to dispose of waste, and renewable fuels have not demonstrated the necessary scale, capability, or economics. There is n**o NIMBY** (not in my backyard) **opposition** to SBSP because the backyard is 36,000 kilometers away in geosynchronous orbit (although placing the receiving rectennas may be a point of contention). Compared with terrestrial solar and wind power, SBSP is independent of local weather conditions and can produce power 24 hours a day. Indeed, space solar power complements, not compete with terrestrial solar power.

## AT: DoD Procurement CP – Squo Solves

### Counterplan is the status quo – inherency proves it’s insufficient

Binns 7-1

Corey, “SPACE-BASED SOLAR POWER,” Power Engineering, http://www.power-eng.com/news/2011/07/1448632564/space-based-solar-power.html

If space-based solar-power satellites are launched-a significant "if," given the political implications of putting lasers in space-the first recipients will probably be research labs at the North and South poles, or other places where power is in short supply. The U.S. Department of Defense has also **expressed an interest** in transmitting space power to the battlefield, where the costs associated with fuel delivery can reach up to $400 a gallon.

## AT: DoD Procurement CP – Limits Benign Use

### Explicit DoD funding limits benign use

Jargan Post 11

Jargan Post 2011, “Space Solar Power can be used during disasters,” http://post.jagran.com/solar-energy-for-emergency-power-supply-1309079712

A larger array of such panels could have provided power to pumps at the Japanese nuclear site where almost all of the problems were caused by a lack of electricity, power needed just to pump water, ironically at a power generating plant, he added. SSP is ultimately intended to provide a very large alternate supply of base load power to the whole Earth, but current very high launch costs have prevented using this system, Strickland said. "We believe that using a few specialised emergency satellites would provide a significant benefit to the Earth – covering emergencies - where power can save lives and property," he said. Only about **three such satellites would be needed for the entire earth,** two for Europe and Asia and one for the Americas, he said. "We believe that it will be possible to build and launch such as set of satellites within a decade using a new generation of cheaper rockets now being built," Strickland said adding that emergency power is much more valuable than base load power, so the launch costs would be affordable for the service provided. For example, a set of three 50 Megawatt satellites would be able to provide one megawatt of emergency power to 150 sites worldwide simultaneously. Alternately, 10 megawatts each could be provided to 15 sites, such as five in the Americas, five in Europe and five in Asia. The cost of building and launching these three satellites would be vastly cheaper than the damage and cleanup required after an accident similar to the current one, Strickland said. When asked whether military programme on the solar power will have some implementing problem affecting such a civil programme, Strickland said the US military has **no lock on any technology** unless it is a "black program" or **unless they funded it**.

## AT: India CP

### CP fails – India deal proves ITAR restricts US companies

NDIA 11

National Defense Industrial Association, “U.S. Industry Loses Big in India: Is ITAR to Blame?”, 4/28/2011, <http://www.nationaldefensemagazine.org/blog/lists/posts/post.aspx?ID=402>

Defense contractors and industry experts are trying to come to grips with India’s decision to exclude The Boeing Co. and Lockheed Martin Corp. from its $11 billion competition for a new fighter jet. No specific rationale has yet been given by the Indian government for its determination to jettison Boeing's F/A-18, Lockheed F-16 and Saab’s Gripen fighters, and proceed with a head-to-head contest only between two European offers — the Eurofighter and the Dassault Rafale. “Companies are very concerned about the logic for the decision,” said a U.S. industry source. “There’s a bit of puzzlement.” India's decision was very surprising, says Tom Captain, vice chairman of global and U.S. aerospace and defense leader at Deloitte LLP. If the selection was based on technical merits, "It is difficult to explain how those two very capable aircraft were eliminated." In the absence of factual information about how the selection was made, speculation is growing that restrictive U.S. export policies may have played a significant role in India’s evaluation of fighter jet candidates. Analysts had predicted that at least one of the two U.S. contenders would have the inside track. U.S. technology is considered more advanced, and more coveted by rising powers such as India. President Obama also raised the stakes by personally making a pitch on behalf of U.S. industry to Prime Minister Manmohan Singh during his visit to India. He also sent Singh a letter reinforcing the importance of India’s fighter program to the Obama administration. India is expected to buy up to 200 new aircraft. “We feel that our products are the best possible available,” said the industry source.” India is projected to spend $80 billion on new weapons and space systems over the next five years. It’s only a small fraction of what the United States spends, but the industry still regards it as a promising region where, once you get a foot in the door, opportunities could blossom. Defense industry analyst Byron Callan contends that “technology transfer was a major consideration in this competition.” Callan presumes that the U.S. government was “unwilling to see key AESA [active electronically scanned array] radar and other avionics and electronic warfare technology made available at the level India wanted,” Callan writes in a memo to industry investors. “Technology transfer has also been a key consideration in Brazil’s FX fighter competition which has been delayed.” One issue to watch as a result of this decision, says Callan, is “whether the U.S. further relaxes defense technology export restrictions in order to keep domestic production lines open.” This is a major concern for U.S. manufacturers as Pentagon spending begins to contract next year. In the past, Callan says, “when the U.S. restrained or reduced its defense spending, policy shifted to exporting advanced weapons to strategic partners.” He notes that F/A-18 production “may still run through the end of this decade based on U.S. orders and from countries that had hoped for F-35s and who operate earlier-generation F/A-18s.” The longevity of the F-16, meanwhile, “hinges on its ability to win in niche markets in the Middle East, but it is less relevant to Lockheed Martin and Northrop Grumman (which makes the radar) with F-35 and the new bomber program ramping up.” For Boeing, losing India’s sales is a big blow because it needs foreign sales to keep the F/A-18 line open beyond the coming decade, unlike Lockheed, which has a long-term lifeline in the multinational Joint Strike Fighter. “It will be interesting to see what India does with combat fighter technology acquired from either Dassault or EADS and BAE Systems, and engine companies as well,” Callan writes. Larry Christensen, an export controls attorney at Miller & Chevalier, in Washington, D.C., believes **the Indian decision will have lasting implications for U.S. industry**, even though he says he has not seen any proof that India’s choice was influenced by ITAR, the International Traffic in Arms Regulations that restrict exports of sensitive U.S. technology. The fact that an emerging power such as India would snub U.S. advanced weaponry offers further evidence that the current export control system — which dates back to the Cold War — has outlived its effectiveness, Christensen says. “The U.S. government cannot repeal the laws of economics,” he says. As the United States denies access to some of its best technology, it leaves a market void that, sooner or later, another country will fill. “When that happens, the U.S. export control policy of denial, or policy of heavy restrictions, become ineffective” for the purposes of barring potential enemies access to advanced weaponry, he says. It is conceivable that India concluded that U.S. restrictions on technology sharing are not worth the hassle, Christensen suggests. Although the United States wanted India to buy its fighter jets, it was “putting strings on those sales” that would have curtailed India’s ability to upgrade components, software or sensors, or collaborate with other countries, he says. If India had picked a U.S. aircraft, ITAR would have "restricted them in their ability to move forward with that platform.” On a smaller scale, the same problem affects U.S. suppliers of less flashy products such as surveillance, law-enforcement and border protection technology, says Christensen. “I know small firms that feel the pain of commercial customers saying that they like the U.S. product but they can’t live with the restrictions and the overhead that goes with ITAR controls.”

## AT: India CP / India Inherency

### Indian can’t succeed *without* US tech advancements

Kanter 9

James, 6-5-2009, “Could India Become a Solar Leader?.” NYT, http://green.blogs.nytimes.com/2009/06/05/could-india-become-a-solar-leader/

India may be gearing to turn itself into the global leader in solar power generation, a sign that major developing nations could become renewable energy hubs to rival Germany and the United States. Called the National Solar Mission, the Indian plan outlines a target for 20,000 megawatts of solar capacity by 2020, according to a draft copy obtained by Greenpeace and posted to the Web. “This would be the most ambitious solar plan that any country has laid out so far,” said Siddharth Pathak, a climate and energy campaigner for Greenpeace India. India would generate 100,000 megawatts of solar power by 2030 and 200,000 megawatts by mid-century under the plan. The plan acknowledges the high cost of solar compared with other sources of energy, and coal in particular. But it says costs could be driven down to between 4 and 5 rupees per kilowatt hour by the period 2017-2020, making solar cost-competitive with fossil fuels. There would be one million rooftop systems with an average capacity of 3 kilowatts by 2020 to cut the use of diesel for daytime power while generation parks could be built in the “exclusion” zones around nuclear plants, where people are not allowed to live but solar facilities could be safely installed. Crucial to the project would be building up local manufacturing capacity. The plan envisages training 100,000 specialists by 2020. It also foresees the need for processing facilities for raw materials, factories and technology parks for making components and equipment and generation parks to produce electricity. India can now make 700 megawatts of photovoltaic modules each year, according to the plan. The aim would be to make 20,000 megawatts of solar cells annually by 2017 and to establish expertise in solar thermal technologies. Total costs would be 85,000 and 105,000 crores ($18.5 billion to $22.8 billion) over a 30-year period. To help finance the project, the plan foresees a significant tax on gasoline and diesel — fuels the government currently subsidizes. The plan also foresees a feed-in tariff, solar power purchase obligations for Indian authorities, tax breaks for manufacturers, and exemptions on tariffs for imported equipment. A so-called Solar Energy Authority of India would be set up to manage the system. But Greenpeace emphasized that **help** **from rich countries** would be **essential for India** to meet its goals. “India needs international support,” Mr. Pathak said. “The industrialized world **needs to come up with** solid proposals on **technology** and finance to help developing countries deliver on ambitious plans like this one,” he said.

## AT: Launch Costs – Can Be Overcome

### Launch costs can be overcome quickly

Chapman 10 – PhD in MIT, NASA Scientist

Philip Chapman, PhD in MIT, NASA Scientist, one of the second intake of NASA scientist astronauts during Apollo, 12-2010, “Deploying Sunsats,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/chapman.html

This paper outlines an analysis of the cost of launching Solar Power Satellites, using launch technology available today. The economies of scale implied by any significant utilization of this energy source will reduce these costs to a level where they contribute less than 2.5¢/kWh to the cost of electric power produced by the system. The only major technical innovation that is needed is the introduction of reusable launch vehicles. While there is certainly room for improvements that would offer even lower costs, the conclusion is that the cost of spaceflight is **not a serious impediment** to realizing the advantages of power from space in the **very near future**.

### This is true even without significant advances

Chapman 10 – PhD in MIT, NASA Scientist

Philip Chapman, PhD in MIT, NASA Scientist, one of the second intake of NASA scientist astronauts during Apollo, 12-2010, “Deploying Sunsats,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/chapman.html

It is important to recognize that spaceflight is not intrinsically expensive. The energy needed to place a payload in low Earth orbit (LEO) is ˜12 kWh/kilogram. If it were possible to buy this energy in the form of electricity at U.S. residential prices, the cost would be less than $1.30/kg. Rockets are very inefficient, but the cost of the propellants needed to reach orbit is typically less than $25 per kilogram of payload. The principal reason that launch to LEO is currently so expensive (>$10,000/kg) is that launches are infrequent - and they are infrequent because they are so expensive. Launch vehicles (LVs) are costly to build because the production volume is low; each LV is thrown away after one use. Annualized range costs are shared among just a few launches, and the staff needed for LV construction and launch operations are grossly underemployed. The quoted prices for launch would be much higher still were it not that in most cases the Department of Defense or NASA has absorbed the LV development cost. The purpose of this paper is to demonstrate that the economies of scale in any significant space-based solar power (SBSP) program will permit launch at acceptable cost, **even without major advances** in launch technology. To be definite, a fairly modest sunsat deployment program is assumed, with the first launch taking place in 2015, leading to an installed sunsat capacity of 800 GWe in 2050. This goal will represent somewhere between 6% and 9% of the total global capacity that we will need by then. The analysis uses simple standard models to approximate the performance and cost of LVs, with subsystem characteristics comparable to those of existing engines and vehicles. The only major technical innovation considered is the introduction of reusable LV stages, and the only major change in spaceflight practice is launch from an equatorial site. There is no attempt to optimize the launch architecture. Improved designs and advanced technologies will offer significantly lower costs than the rough estimates obtained here.

## AT: Launch Costs – Plan Solves

### The plan creates a market for low-cost launches

NSS 11

National Space Society, Last Updates 5-2-2011, “Space Solar Power Limitless clean energy from space,” http://www.nss.org/settlement/ssp/

The United States and the world need to find new sources of clean energy. Space Solar Power gathers energy from sunlight in space and transmits it wirelessly to Earth. Space solar power can solve our energy and greenhouse gas emissions problems. Not just help, not just take a step in the right direction, **but solve**. Space solar power can provide large quantities of energy to each and every person on Earth with very little environmental impact. The solar energy available in space is literally billions of times greater than we use today. The lifetime of the sun is an estimated 4-5 billion years, making space solar power a truly long-term energy solution. As Earth receives only one part in 2.3 billion of the Sun's output, space solar power is by far the largest potential energy source available, dwarfing all others combined. Solar energy is routinely used on nearly all spacecraft today. This technology on a larger scale, combined with already demonstrated wireless power transmission (see 2-minute video of demo), can supply nearly all the electrical needs of our planet. Another need is to move away from fossil fuels for our transportation system. While electricity powers few vehicles today, hybrids will soon evolve into plug-in hybrids which can use electric energy from the grid. As batteries, super-capacitors, and fuel cells improve, the gasoline engine will gradually play a smaller and smaller role in transportation — but only if we can generate the enormous quantities of electrical energy we need. It doesn't help to remove fossil fuels from vehicles if you just turn around and use fossil fuels again to generate the electricity to power those vehicles. Space solar power can provide the needed clean power for any future electric transportation system. While all viable energy options should be pursued with vigor, space solar power has a **number of substantial advantages** over other energy sources. Advantages of Space Solar Power Unlike oil, gas, ethanol, and coal plants, space solar power does not emit greenhouse gases. Unlike coal and nuclear plants, space solar power does not compete for or depend upon increasingly scarce fresh water resources. Unlike bio-ethanol or bio-diesel, space solar power does not compete for increasingly valuable farm land or depend on natural-gas-derived fertilizer. Food can continue to be a major export instead of a fuel provider. Unlike nuclear power plants, space solar power will not produce hazardous waste, which needs to be stored and guarded for hundreds of years. Unlike terrestrial solar and wind power plants, space solar power is available 24 hours a day, 7 days a week, in huge quantities. It works regardless of cloud cover, daylight, or wind speed. Unlike nuclear power plants, space solar power does not provide easy targets for terrorists. Unlike coal and nuclear fuels, space solar power does not require environmentally problematic mining operations. Space solar power will provide true energy independence for the nations that develop it, eliminating a major source of national competition for limited Earth-based energy resources. Space solar power will not require dependence on unstable or hostile foreign oil providers to meet energy needs, enabling us to expend resources in other ways. Space solar power can be exported to virtually any place in the world, and its energy can be converted for local needs — such as manufacture of methanol for use in places like rural India where there are no electric power grids. Space solar power can also be used for desalination of sea water. Space solar power can take advantage of our current and historic investment in aerospace expertise to expand employment opportunities in solving the difficult problems of energy security and climate change. Space solar power can **provide a market large enough** to develop the **low-cost space transportation system that is required for its deployment**. This, in turn, will also bring the resources of the solar system within economic reach.

### Government-induced interest jump-starts market competition to lower launch costs – makes the whole project feasible

Williamson 10 – Space Consultant

Mark Williamson, Technical Consultant at Willis InSpace, Sole author of 6 books, author of over 20 refereed articles, “May the Power be With You,” Engineering & Technology, EBSCO

So why, if SSP is so feasible, and given the current energy crisis, has none of the world’s space agencies chosen to fund a technology demonstration mission? John Mankins, former Nasa engineer and now President of the Space Power Association told E&T that SSP represents “a classic conundrum” in that “energy agencies don’t do space, and space agencies don’t do energy”. Of course, the idea of a demonstrator is to **prove the technology works**, which is where EADS Astrium’s proposal for a demonstration satellite comes in. Based on the AlphaSat platform currently under development by a European consortium, it would provide up to 20kW of DC power from its solar arrays. According to Astrium’s chief technical officer Robert Laine, recent advances in solar cell efficiency and laser technology in Europe have brought the idea much closer to reality. Indeed, Astrium has been working with its subsidiary, Surrey Satellite Technology, “on converters that would transform the laser signal into energy”, meaning that most of the required technology is available ‘in-house’. EADS has made it clear that the demonstration will not go ahead without partners – space agencies, national governments or even power companies – to help fund the project. Nevertheless, foreseeing the need for “a group of partners from across both the energy and space sectors”, Matthew Perren, Astrium’s innovation manager, confirmed that “Astrium has received many expressions of interest from a number of potential partners, both institutional and commercial”. A proposal for a solar power satellite announced by the Japan Aerospace Exploration Agency (JAXA) in 2008 has a similar goal, with a more powerful 10MW demonstrator planned for 2020, but the agency also hopes to be able to deliver a gigawatt from space by 2030. Although researchers have made progress in demonstrating an 800W optical-fibre laser and mirrors that reflect light efficiently at 1µm – a frequency chosen for its ability to pass through the atmosphere with limited attenuation – some other reported numbers make the project look like science fiction. Kilometre-long solar panels, spacecraft masses in the thousands of tonnes, and price tags in the “tens of billions” make an operational system seem further away than the elusive fusion reactor. With launches of five-tonne satellites currently costing upwards of $50m, “the cost of launch is certainly a hurdle”, confirms Mankins. “However, launch costs are driven by markets more than anything else,” he says, and launches are so expensive because there are so few of them per year. In fact, in Mankins’s opinion, the emergence of a large new commercial market for launches, such as SSP, “**will bring down the cost dramatically of getting to space**”.

## AT: Asteroid Detection DA – Other Limits

### Non-unique – sun limits detection now

ASTRA Report 10(ASTRA: Asteroid Mining, Technologies Roadmap and Application, Final Report, International Space University Space Studies Program 2010)

The detection of NEOs is complicated as many are dark and thus hard to see using Earth-based observations in the visible spectrum. The solution is to use infrared telescopes. However, the atmosphere is opaque in the infrared frequencies, which means that such telescopes must be space-based. Another problem is that many NEAs have orbits that are contained either partially or fully within the orbit of the Earth. As such, they are extremely difficult to see from the Earth against the glare of the Sun. Currently, no dedicated space-based NEO detection spacecraft exist, although both Germany and Canada are working on this. (Johnson, 2010; NRC, 2010) pg. 4

### Other factors inhibit asteroid detection now

Shaffer et. Al. 94—Group of scientists applying for a patent for Space based Asteroid detection (Jan 25, 1994 “Space-based asteroid detection and monitoring system” http://www.google.com/patents?hl=en&lr=&vid=USPAT5512743&id=TqggAAAAEBAJ&oi=fnd&dq=Space-Based+Asteroid+Detection+and+Monitoring+System.&printsec=abstract#v=onepage&q&f=false)

Currently, ground-based telescopes are used for detecting and monitoring NEAs and other near earth objects. However, ground-based monitoring and detection schemes suffer from several limitations. For example. Small objects such as NEAs with diameters of 50 meters cannot be reliably detected using ground-based telescopes. The performance of ground-based systems is affected by factors such as the sun, atmospheric turbulence, and cloud cover which limits the size and distance of the NEAs detected. Additionally, there are only enough ground based systems to monitor a small fraction of the celestial sphere every day. Because the earth turns on its axis with a twenty-four hour period, any ground based system can examine only one latitudinal section of the celestial sphere per day. Thus ground based systems are inherently slow, or require an unacceptably large number of telescopes. The high cost of building the many needed observatories, the great number of persons needed to operate the systems, and the limiting factors of the sun, clouds and atmospheric turbulence make the use of ground-based systems prohibitive.

## AT: Asteroid Detection DA – No Link

### No link-- Japanese studies prove no interference

Ramos 2k—Kim, Major in the USAF and graduate of the AIR COMMAND AND STAFF COLLEGE (April 2000, “SOLAR POWER CONSTELLATIONSIMPLICATIONS FOR THE UNITED STATES” <https://www.afresearch.org/skins/rims/q_mod_be0e99f3-fc56-4ccb-8dfe-670c0822a153/q_act_downloadpaper/q_obj_73510976-ad5e-4d5d-a51c-a7103406f67d/display.aspx?rs=enginespage>)

The final barrier to implementation is frequency interference. In the arena of communications, before scientists conducted experiments, many supposed that there was a potential for interference from the beam on communications systems, radar, and aircraft communications in the geographic area of the beam. A Japanese study conducted in 1993 demonstrated that a high power microwave beam would not be strong enough to interfere with telecommunications. However, most of the articles and research supporting solar power satellites still list frequency or communications interference as an issue to resolve.

## AT: Asteroid Detection DA – Satellites Solve

### Asteroid detection in space solves—German Satellite makes spinoffs

Seidler 10 –Christoph, writer for the SPIEGEL, an international newspaper in Germany (03/19/2010 “German Satellite to Help Detect Threats to Earth” <http://www.spiegel.de/international/germany/0,1518,684375,00.html>)

And that's where a satellite currently being developed in Germany can play a role. Plans for the satellite -- which according to its builder, will be 80 centimeters wide and deep and 100 centimeters high, as big as a small refrigerator -- are slowly taking shape in Bremen. The plan is to have the satellite operational by 2013. Prior to this initiative, it was primarily the Americans who were interested in the search for asteroids. But researchers often lacked sufficient funding. In addition, the Americans have primarly conducted research into the astroid belt between Mars and Jupiter. By contrast, the German satellite will observe what are known as "inner Earth objects," which are traveling closer to Earth. "Up until now there have been no efforts to try to find this type of asteroid," Kührt explains. There are a lot of problems to solve, not the least of which is fairly mundane-sounding issue: If you stare into the sun during the day, you will have little serious chance of seeing any stars. So how can one hope to be able to recognize a few comparably small, faint stones? To some degree the AsteroidFinder has good potential to overcome this issue: Its planned orbit takes it around the earth along the border of day and night, also known as the Terminator line or the twilight zone. No matter what, the 25 centimeter telescope will still need to be able to make highly precise scans. In theory the satellite will be carrying a computer chip, similar to the kind that is used in commercial digital cameras. But the chip must be cooled down to temperatures as low as -80 Celsius and be exceptionally good at filtering out any static. Fast shutter speeds should help ensure that the pictures are not as out of focus as some jittery holiday snapshot of a walk on the beach at dawn. Numerous snapshots from the satellite will be used to compose the celestial images. Each day, AsteroidFinder is expected to send around 14 gigabytes of data back to Earth at the DLR station in Neustrelitz. "We have to pick up extremely small signals," DLR scientist Peter Spietz says. The space agency is then able to calculate the path of the asteroids after collecting several days worth of data. Small Budgets, But Considerable Responsibility Spietz appears tense. He has to coordinate specialists from eight DLR institutes, all of whom are working on the project. The budget is comparatively small, but the responsibility is significant. The scientists also want to use the project to show that satellites can be built more cheaply and still remain reliable. "We want to create price-effective projects, within shorter time frames," says Hansjörg Dittus, the head of the Institute of Space Systems in Bremen. The scientists hope that if the asteroid scout is successful, that they can use the same technology to build other types of observational satellites. They will be able to use the same substructure -- power, layout and communication systems -- to create other similar instruments. Work on the asteroid project is expected to last three more years. The pressure on the scientists behind the satellite will be huge if it flops. But nobody wants to think about that. Specifications for the satellite's individual components are expected to be completed by the end of the year, but there is still plenty of work to do. Afterwards, AstroidFinder will be built and then tested under the strenuous conditions it would undergo in outer space: It will be shaken, frozen and irradiated.

## AT: Weaponization DA

### It won’t be used as a weapon

NSS 7 – Joseph Rouge, SES Acting Director, National Security Space Office (“Space Based Solar Power As An Opportunity or National Security,” <http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf>, October 9, 2007)

The physics of electromagnetic energy beaming is uncompromising, and economies of scale make the beam very unsuitable as a “secret” weapon. Concerns can be resolved through an inspection regime and better space situational awareness capabilities. The distance from the geostationary belt is so vast that beams diverge beyond the coherence and power concentration useful for a weapon. The beam can also be designed in such a manner that it requires a pilot signal even to concentrate to its very weak level. Without the pilot signal the microwave beam would certainly diffuse and can be designed with additional failsafe cut‐off mechanisms. The likelihood of the beam wandering over a city is extremely low, and even if occurring would be extremely anti‐climactic. • Certainly both the rectenna and satellite are vulnerable to attack, just like every other type of energy infrastructure. However, it takes significantly more resources and sophistication to attack an asset in geostationary orbit than it does to attack a nuclear power plant, oil refinery or supertanker on Earth. The satellite is also very large and constructed of a number of similar redundant parts, so the attack would need to be very precise. An attack on the receiving antenna would probably be the least value‐added attack, since it is a diffuse and distributed array of identical modular elements that can be quickly repaired while the receiving station continues to operate. Nevertheless, the best routes to security are a diversity and redundancy of clean energy sources, and a cooperative international regime where those who are capable of damaging a SBSP system also have an interest in preserving the new infrastructure for their own benefit.

### Political actions will be taken to make sure it’s not even perceived as one

NSS 7 – Joseph Rouge, SES Acting Director, National Security Space Office (“Space Based Solar Power As An Opportunity or National Security,” <http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf>, October 9, 2007)

The SBSP Study Group found that there is likely to be concern, both domestically and internationally, that a SBSP system could be used as a “weapon in space,” which will be amplified because of the interest shown by the DoD in SBSP. • Mitigating these concerns, developing trust, and building in verification methods will be key to political consensus for sustainable development of SBSP. o **Recommendation:** The SBSP Study Group recommends that the federal government should take reasonable and appropriate steps to ensure that SBSP systems cannot be utilized as space‐based weapons systems, and to dissuade and deter other nations from attacking these strategic power sources, including but not limited to: 􀂃 Tasking a civilian federal agency to be the lead agency responsible for federal investments in SBSP and in the demonstration of key technologies needed by industry. 􀂃 Providing transparency and open public dialogue throughout the development and build‐out phase to reduce the risk of public misperceptions regarding SBSP. 􀂃 Encouraging all nations to develop SBSP systems — either on their own or as partners, customers, suppliers, or co‐owners with any U.S. development effort to maximize the stakeholder base and to minimize the potential antagonist base. 􀂃 Mandating open international inspections of SBSP systems before launch from Earth to the extent necessary to ensure that the systems being launched are not weapons. 􀂃 Developing internationally approved on‐orbit inspection systems that can verify compliance with international agreements

### It won’t be weaponized

**IAA 11** (April, 2011, International Academy of Aeronautics, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf)

Policy Issue Summary. The principal issue related to potential weaponization is related to the wireless power transmission system of the SPS. In the 1970s, there was little or no issue associated with the weaponization of SPS platforms for several reasons. For example, the 1979 SPS Reference System involved a low intensity microwave power transmission system. Moreover, the beam was incapable of being rapidly redirected due to the use of a huge mechanical gimballing system for large angle point. And, all of the systems in the ERDA-NASA studies of the late 1970s were to be positioned over the equator at the longitude of the US.

## AT: Debris DA – Not Insurmountable

### No debris DA

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

Some of the important policy considerations examined included (1) the overall international regime (e.g., the Outer Space Treaty) that will comprise the framework for space solar power development; (2) various international legal requirements (e.g., the ITU, and space debris mitigation guidelines) with which SPS must comply; and, (3) relevant national legislation and regulations (such as ITAR in the US and similar rules in other countries). Detailed topics examined included (1) WPT beam health and safety considerations; (2) WPT spectrum allocation and management; (3) space debris considerations; and, (4) potential weaponization concerns. **None of these factors appears to be insurmountable** for SPS R&D eventual deployment. However, each of these (and others) will require appropriate attention during the early phases of SPS development. This is particularly true with respect to issues related to WPT beam safety and possible weaponization.

## AT: Debris DA – Too High

### Too high for space junk

Boerman 9 – Solaren’s Director of Energy Services

Cal Boerman, Solaren's Director of Energy Services, Plans for solar power from outer space move forward, 2009, Daily Finance, http://www.dailyfinance.com/2009/09/26/plans-for-solar-power-from-outer-space-move-forward/

Won't the signals hurt birds or knock down planes? See full article from DailyFinance: http://srph.it/iW12TM Not at all. The effects of RF signals on the human beings and birds and airplanes are well understood. We know what the safety standards are. We've been transmitting things this way for a long time. We need to make sure that our signal is controlled. The effect of RF energy on the human body is a heating effect. The energy levels we'll be working with are a lot less than you might feel if you were sitting out in the midday because the beam will be spread out over a very wide areas. The receiving antenna on the ground will be a couple of square miles. It's a big area but that means the beams are at lower concentration. As for airplanes, they would feel more heat coming out from under clouds than they would entering our beam. Remember, the satellites are 22,000 miles up, far above where planes or birds fly. We're so high up that **even space junk is not an issue**.

### SPS can be portable and spends of its life in GEO – solves the impact

IAA 11

International Academy of Astronautics, Academy that brings together the world's foremost experts in the disciplines of astronautics on a regular basis to recognize the accomplishments of their peers, and explores and discuss cutting-edge issues in space research and technology, 4-2011, “The First International Assessment of Space Solar Power: Opportunities, Issues and Potential Pathways Forward,” Green Energy From Space Solar Power, http://iaaweb.org/iaa/Scientific%20Activity/Study%20Groups/SG%20Commission%203/sg311/sg311finalreport.pdf

Space Debris Considerations Policy Issue Summary. An issue that has increased dramatically in importance since the 1970s is that of space debris. The principal regime in which orbital debris is found is that of LEO – due largely to ETO transportation-derived fragments. There are three aspects to this issue for SPS. The first issue is the potential impact of LEO debris on dedicated SPS infrastructure. The second issue is the potential production of LEO debris by SPS ETO and in-space transportation. Finally, the third issue is the potential interaction of GEO SPS in-space transportation with LEO debris. Potential Impact of LEO Debris on SPS Infrastructure. The existing significant space debris environment in low Earth orbit (LEO) places significant operational constraints on concepts and operations for future SPS infrastructures. In particular, it is evident that SPS systems can spend only a limited period of time in LEO before being transported beyond to higher, safer orbits. Potential Production of LEO Debris by SPS Transportation. At the same time SPS transportation to space and operations in LEO are at some risk due to LEO space debris, it is also critical that the R&D to development systems concepts and supporting ETO and in-space transportation must consider carefully the possible production of additional debris in LEO. Given the immense scale of SPS operations, it is evident that SPS systems and infrastructures must be designed and developed to minimize the production of space debris under normal circumstances, and to be “failsafe” vis-à-vis space debris in the event of a mishap. Interaction of the GEO SPS and Space Debris. The risk due to space debris is significantly less in GEO than it is in LEO. However, as in the case of LEO given the immense scale of SPS operations in GEO, it is evident that SPS systems and infrastructures must be designed and developed to minimize the production of space debris under normal circumstances, and to be “fail-safe” vis-à-vis space debris in the event of a mishap. In this light, the standard practice of removing a failed GEO satellite by simply boosting it slightly outside of that orbit is clearly unacceptable. SPS in GEO must be developed to incorporate proactive containment and essentially permanent disposition of any failed system elements. Assessment of Impact(s). The overall impact of this policy / technical issue on SPS concept options should be **readily managed**. The greater the degree of modularity in the SPS concept, the less vulnerable the overall SPS platform will be to an ill-timed space debris impact; contrary-wise, the greater the degree to which the SPS platform is monolithic and its elements unique during transportation, then the greater the degree of vulnerability of the platform concept to space debris.

### Not susceptible to debris

Grey 2k

Jerry, Director of AIAA, Federal News Service, Congressional Testimony, 9-7-2000, Lexis

(2) Orbital Debris. Although the SSP configurations are large, their diaphanous nature and location in geostationary or geosynchronous halo orbits imply low susceptibility to serious damage by either natural or anthropogenic orbital debris. Moreover, since all the proposed concepts employ robotic inspection and maintenance, repairs of any such damage should be able to be accomplished.

## AT: Debris DA – SPS Solves Debris

### SPS solves debris

Grey 2k

Jerry, Director of AIAA, Federal News Service, Congressional Testimony, 9-7-2000, Lexis

The AIAA assessment suggested a number of opportunities for multiple use of the SSP-enabling technologies in terrestrial and space endeavors Of these, the following high-priority areas were identified: (1) Human space exploration. (a) Power systems for the Martian surface. If nuclear systems turn out not be available for use, large photovoltaic arrays in the 100 - 200 kWe range, coupled with wireless power transmission (WPT), become highly promising.These solar power systems are especially attractive if they can be combined with an Earth-Mars transportation system using solar- electric propulsion (SEP). (b) In-space transportation. SEP is generally considered a viable alternative to nuclear thermal propulsion for human Mars exploration. (c) Beamed power. WPT could be used for mobile extraction systems deployed in permanently-shadowed cold traps at the lunar poles and for in-situ resource utilization at various locations on Mars. Other applications include beamed power to communications and information- gathering stations on planetary surfaces or in orbit; e.g., high-power radar mappers; mobile robotic systems; remote sensing stations; dispersed habitation modules; human-occupied field stations; and supplementary power to surface solar power systems during periods when they are shadowed. (2) Science and robotic space exploration (a) Multi-asteroid sample return. Visit a significant number of belt asteroids in a 2-5 year period, collecting samples for return to Earth. (b) Asteroid/comet analysis. Determine the chemical content of comets and asteroids on rendezvous missions (enabled by solar-electric propulsion) by using deep-penetration imaging radar and by beaming laser and/or microwave power down to the surface to vaporize material for spectrographic analysis. (c) **Orbital debris removal**. Use beamed energy to rendezvous and grapple with a piece of space junk. Space-based lasers could also be used to vaporize **smaller debris or to redirect the orbits of larger pieces to atmospheric reentry trajectories**. (d) Weapons-oriented demonstrations. Fire a high-energy laser from a lunar orbiter at the lunar surface to vaporize and excite surface materials, determining their chemical composition with a spectrometer aboard the orbiter. (e) In-space transportation. Use SEPS for a wide variety of science missions, also using WPT for sensor deployment via laser sails, laser- thermal propulsion, and laser-electric propulsion. (f) International space station (ISS). Replace ISS solar arrays using advanced SSP technologies, and use WPT for co-orbiting experiment platforms. (g) Radar and radiometer mappers. Use high-power planetary probes to conduct radar mapping of planetary surfaces and high-power radiometer surveys for comprehensive scientific studies of planetary environments. (h) Rovers. Deploy many small rovers on lunar and planetary surfaces using WPT. (i) Networked sensor systems. Use hundreds of tiny WPT-powered sensors to conduct detailed four-dimensional surveys of interplanetary and other space regions.

## AT: Debris DA – Government Solves

### The government has been mitigating space debris since the 90’s

Jesusa Cruz, JD from Barry School of Law, 2003, “Wanted: A collective effort towards space debris mitigation,” Panton Law, www.pantonlaw.com/uploads/5/2/6/4/526435/space\_debris\_mitigation.doc+federal+government+space+debris

The government updated its orbital debris report in 1995, issuing the following recommendations: (1) to continue and enhance debris measurement, modeling, and monitoring capabilities; (2) conduct a focused study on debris and emerging low earth orbit (LEO) systems; (3) develop government/industry design guidelines on orbital debris; (4) develop a strategy for international discussion; and (5) review and update U.S. policy on debris. A year after the issuance of this report, President Clinton reaffirmed the earlier policy by calling for U.S. government agencies to minimize space debris. The 1996 policy required NASA, DoD, the intelligence community and the private sector to develop design guidelines for U.S. government space hardware procurements and stressed a United States leadership role in urging other nations to adopt debris mitigation practices and policies.

## AT: Spending DA

### The thesis of the disad is flawed – we have to take a different approach to analyzing SSP in terms of economics

Woodell 2K– manager at Controversy Management & Risk Communications

(Mary, “Power from space: the policy challenge,” Space Policy 16 (2000) 93-97, Elsevier, dml)

Some of these hurdles are technological; others are economic. A primary challenge for SSP research and development is to demonstrate the ability to deliver an acceptable return on investment (ROI) for funding entities, and an acceptable unit cost to the end user. The case can be made, however, that traditional formulae for determining ROI may fail fully to capture a critical dimension when applied to consideration of energy alternatives, i.e. the cost - both direct and indirect - of doing nothing. Similarly, a one-to-one, dollar-for-dollar comparison of unit cost fails to consider the consequences over time of continued reliance on a finite resource. In keeping with the spirit of taking a fresh look at SSP (or, indeed, at any non-traditional approach), it may be that these conventional equations should, themselves, be redefined. A more holistic, or macro, view of ROI would attempt to estimate and factor in the aggregate cost of mitigating the global environmental effects of increasing levels of greenhouse gases. In a similar vein, comparisons of the unit costs of delivering fossil fuel/combustion-based energy versus SSP should take into account that, as these resources are exhausted, their scarcity will drive costs sharply up—unless they are supplemented and ultimately supplanted by alternative energy sources. Taking this approach yet further, a truly multidimensional approach to consideration of ROI and end-user costs would address more complex human and social factors, which can be difficult to quantify but that significantly affect overall economic impact. For example, the demand for industrial growth within the developing world, and the related demand for political parity, if continued unmet, will surely have geopolitical consequences over time - the potential for and the cost of which should at least be acknowledged in any discussion of world energy economics. Large-scale initiatives such as SSP lend themselves to this kind of scenario-based cost-benefit analysis inasmuch as both costs and benefits are, virtually by definition, complex and broadly diversified. Moreover, both must be considered longitudinally, evolving over time, rather than as fixed points in a transaction. Finally, any such analysis must acknowledge that, in the case of initiatives on this scale and with this potential impact, direct cost will often yield indirect (although still quantifiable and valuable) benefit—sometimes in the form of a loss avoided, a downside risk mitigated, or an undesirable outcome pre-empted. In other words, the relatively straightforward cost}benefit equation that determines, e.g. whether or not a US utility company builds a new power plant in the northeast region, does not apply, and cannot yield a meaningful result in the far broader context of SSP. In the former case, virtually all variables are known, and many are captive - that is, within the control or purview of the investing entity. External factors are generally understood, and their influence predictable on the basis of past experience - as is the end result or output. In this case, the utility company is, at once, the primary decision maker, the investor, and the beneficiary. In effect, the relationship between cost and benefit is linear and self-contained. By contrast, in the case of SSP, that relationship is multidimensional and dynamic, and the cost-benefit equation is subject to multiple variables - e.g. market forces, macroeconomic trends, social and political factors - which, while they can be influenced, are clearly outside a sponsoring (or investing) entity's control. Outcome is contingent in large measure on the interaction of these variables, and both cost and benefit will be realized on a distributed basis. In fact, decisionmaking itself is, as a practical matter, distributed as well, insofar as no single entity, public or private, has the capacity unilaterally to deliver energy from space. A scenario-based approach to evaluating ROI would take these macro factors into account, assign values to key variables, and project a range of potential interactions - all of which can affect progress and outcome. At the same time, such an approach would consider the cost and the benefits of SSP at the macro level, that is, globally, in the aggregate - independent of where or by whom costs are incurred or benefits accrued - and using expanded definitions that include indirect, hidden, or deferred costs and benefits. While an exercise such as this would initially yield theoretical results, it would go a long way towards capturing the true value (aggregate benefit net of aggregate cost) of realizing a global concept such as SSP, creating a valuable tool for policy makers. At least as important, it would help to establish a common framework for understanding, at the global level, the risks and rewards of SSP in the context of real-world impact.

## AT: Launches DA

### Lunar mining solves

Globus 8 – NASA Board of Directors

Al, “Lunar material will be an important asset in the construction and launch of solar power satellites,” 2008, Ad Astra, http://www.nss.org/adastra/AdAstra-SBSP-2008.pdf

The environmental impact of these launches is also a concern. Today there are few launches and, therefore, they have little effect on the atmosphere. What will happen when hundreds of thousands of rockets are dumping exhaust, even clean exhaust, into the upper atmosphere? If the vehicles are reusable, which we expect, they will use atmospheric drag to come down. The heat generated will create a number of chemical reactions in the upper atmosphere. What will be the effect? We don’t know. There’s reason to believe the problems won’t be severe, but the studies conducted so far are inadequate. Solution: lunar Materials Both the cost and environmental impact of launches **can be** **massively reduced** long-term through the use of lunar materials. In that scenario, only the facilities to mine the moon and convert these materials into solar power satellites need be launched from Earth. It’s the difference between launching a car factory, which is large, versus the millions of cars it produces, which is a lot bigger. SSP satellites can be made largely of silicon and metals: silicon to convert sunlight to energy, and metals for structure, mirrors, and the antenna. The Apollo program proved conclusively that the moon contains large quantities of both. Launch from the moon requires far less energy than launch from Earth, because the moon is much smaller and therefore exerts a much weaker gravitational pull. Also, geosynchronous orbit is 12,400 m/s from the Earth’s surface, but only 4,600 m/s from the surface of the moon. Of course, launch from the moon would also have no effect on the Earth’s atmosphere. The Stanford/NASA summer studies (see references on page 36) closely examined electromagnetic launch of materials from the moon, which requires no fuel, only energy. This system, called a mass driver, could deliver millions of tons of material per year to orbit. A mass driver works using electromagnetic forces to provide rapid acceleration, similar to the initial startup of some roller coasters. On the moon magnetic buckets full of lunar materials ride an electromagnetic wave generated by structures installed on the lunar surface. At just the right point, the buckets release their payload and return for reuse. The payload is sent into space at very high speed with no fuel cost or terrestrial environmental impact. Lunar materials must be converted into satellite components, a difficult materials processing and manufacturing problem in an unfamiliar, unique environment. Some of the work, such as mining, must be conducted on the lunar surface. Other work, such as assembly and test of solar power satellites must be conducted in orbit. The rest of the work, materials processing and component manufacture, will be divided optimally between these locations. To minimize the mass launched from the moon, we may want to process the materials to eliminate the bits not needed in orbit. Because lunar dust is small, sharp, and difficult to deal with, we may also wish to fuse the material to avoid launching lunar dust to the orbital work site. Conversion of the processed materials into satellite components might best be done in orbit since bulk materials can take a great deal of shaking and acceleration on launch, but more complex components often cannot. Lunar and orbital SSP operations may require only a small staff because many of the operations may be automated or remotely controlled from Earth, like unmanned aircraft, undersea robots, and most of today’s spacecraft. Although there is a communications delay of about three seconds for the roundtrip to the moon and back, preliminary experiments suggest that operators can easily accommodate this delay for at least some tasks (see references). It is clear that research and testing of remote operations and automation on the moon and in orbit would help reduce the risk and cost of future SSP operations. While SSP development has many, many problems, they are the kinds of problems we can solve. Although there is a lot of work to be done, there is a real pot of gold at the end of the rainbow: all the clean renewable energy we could possibly want. Importantly, **no other energy option** offers the quantity and environmental advantages of SSP from lunar materials. The vast majority of the work is done on the moon and in orbit, thousands of kilometers from the Earth’s biosphere. If we were to decide today to vigorously pursue SSP built from lunar materials, what should we do? While that is a complex question, here’s a start: ß Build a series of increasingly capable SSP systems, starting with something small and working up to a fully-operational satellite and ground system. ß Use the International Space Station (ISS) to develop the necessary in-orbit processing, manufacturing and assembly technology. ß Use NASA’s lunar base to develop the necessary mining and processing technology and infrastructure. Develop less-expensive launch vehicles through research, funding prizes, granting private developers’ access to unique government facilities, and guaranteeing government markets. ß Develop simulators to conduct research on teleoperated and automated lunar and orbital mining, processing, manufacturing and assembly. ß Develop closed-loop life support—recycling air and water, reclaiming waste, and growing food—on the ground and on the ISS to reduce launch requirements. ß Conduct a major research effort to determine the impact of high launch rates on the Earth’s atmosphere. Besides creating a lasting and clean energy source, building SSP from lunar materials will develop lunar mining, in-space materials processing, launch vehicles, closed-life-support systems, and large satellite construction—much of what we need to create communities beyond Earth. SSP, particularly built from lunar materials, would be a huge step towards realizing the NSS Vision.

## AT: Debt Ceiling

### Loan Defaults would not collapse the economy – investors are used to political hype and bankers are already preparing for the worst to safeguard the economy

Schroder and Watson 11– Staff Writers for The Hill (Debate over raising debt ceiling plays with explosives, says Wall Street, <http://thehill.com/homenews/administration/155399-debate-over-debt-ceiling-plays-with-explosives-says-wall-st>) AS

It sees **the fight over the debt ceiling as playing with plastic explosives**, said Steve Bell, a former staff director with the Senate Budget Committee. Bell, who is now at the Bipartisan Policy Center, said his group’s scholars have heard from the heads of large Wall Street financial institutions worried that the last-minute nature of the talks on the spending measure foreshadows the debate on the debt ceiling. “They said that Congress better not think they can play the same shenanigans with the debt ceiling,” Bell said. Fresh from last week’s deal, lawmakers are turning to the fight over raising the $14.3 trillion debt limit. Republicans say the administration must agree to steep spending cuts to win their support to raise the ceiling by a May 16 deadline set by the Treasury Department. The administration is demanding a clean bill, but likely realizes it will need to agree to some spending cuts to win a hike in the debt ceiling. Financial markets already are watching closely. “What markets typically dislike the most is uncertainty,” said Douglas Holtz-Eakin, the president of the American Action Forum and former director of the Congressional Budget Office. “The more it drags out, the greater that impact will be, and that’s not a good thing.” Wall Street comes to the debate with the experience of the financial crisis. “**Investors have been conditioned to expect drama,” said Brian Gardner, the senior vice president of Washington research at Keefe, Bruyette & Woods. Thanks to the financial crisis, Wall Street’s understanding of D.C.’s machinations, including political theater, is at “an all-time high**.” Wall Street got a taste of the drama Capitol Hill can serve on Sept. 29, 2008, when the House voted down the Troubled Asset Relief Program (TARP) in the midst of the financial crisis. The Dow Jones Industrial Average responded by dropping over 700 points. The plunging markets unnerved lawmakers, and the bailout program was passed by Congress days later. Bell said people on Wall Street are saying that a failed debt-ceiling vote on the House floor would be like the first failed vote on TARP — only worse. “I think you would have a similar reaction in the bond market and — most people don’t realize this — the bond market is an order of magnitude bigger than the equities market,” he said. Still, because of the TARP experience, Gardner said Wall Street will not panic as much as the debt-ceiling debate unfolds. “TARP is not far in the rearview mirror,” he said. “**If the debt ceiling doesn’t get raised immediately when it comes up, and investors view that just as a negotiating tactic … then the market reaction will be negligible.”** Over the years, Congress has made a habit of squeezing every drop from the debt-limit debate. A 2008 study from the Congressional Research Service (CRS) that analyzed previous debt-limit hikes indicates lawmakers have been willing to fill the limit to the brim before increasing it. For example, in 2003, Congress waited to approve an increase until the Treasury had come within $25 million — or 0.0004 percent — of reaching the then-$6.4 trillion limit. Sen. Tom **Coburn (R-Okla.) said this weekend he expects Congress to cut it close on the debt limit, forcing the Treasury to work to avoid a default. Treasury Secretary Timothy Geithner has told Congress that the limit will be reached by May 16, and that the Treasury’s tools can stave off a default on U.S. debt until July 8.** “I think [the vote to increase the debt ceiling is] going to be sometime between June 10 and July 4,” Coburn said on Bloomberg TV’s “Political Capital With Al Hunt.” “That’s how far the secretary has said he can stretch this thing out.” Congress raised the debt limit seven times from 1996 to 2007 — and six times the Treasury had to take unusual steps to avoid a default before lawmakers approved a boost, according to a February study from the Government Accountability Office. However, even if Wall Street expects the debt limit to be raised eventually, the stakes are so high they are still prepping for the catastrophic chance Congress fails to act and the government defaults on its debt. “**Banks are already making contingency plans, just in case**,” said Gardner. Jamie Dimon, chairman and chief executive officer of JPMorgan Chase & Co., said in March that he expects every company holding Treasury bonds to begin looking to sell if it appeared the U.S. could default on its debt. “A lot of people will have to start selling this stuff,” he said at a March 30 event hosted by the U.S. Chamber of Commerce. **“We’d be getting prepared for it way ahead of time. I would be taking really drastic action. It would be really unpleasant**.”

### Debt Ceiling will not cause economic collapse – Investors are still lending capital and international interests will not tank the economy

ETF 11 - ETFguide is the information leader on exchange-traded funds because of its vendor-neutral approach and its progressive reporting style. (Should the debt ceiling change the way you invest, <http://www.investorplace.com/47472/debt-ceiling-debate-invest-federal-spending/>) AS

The deteriorating financial condition of a borrower coupled with a maxed out credit line typically leads to higher loan rates. This is a common occurrence with financially over-extend consumers just as it is with corporations in the same predicament. Why? Because distressed borrowers inevitably get borrowing rates reflective of that distress. Oddly, this hasn’t been the government’s case. The yield on 10-year Treasury notes is around 2.95%, well below the 7% average over the past three decades. The yield on three-year Treasuries is just 0.65% and five-year inflation linked securities yield around 0.44%. Similar yield trends can be seen in U.S. Treasuries with 10-20 year durations and 20+ year durations. Do any of these numbers reflect distressed borrowing rates? Obviously not. In contrast to foreign governments like Japan, the majority of U.S. government debt is not domestically held but foreign owned. What does it mean? The translation is that the government is immensely dependent on the lending generosity of strangers. And thus far, these strangers have been delighted to continue lending capital to the government at absurdly low rates.Are you one of them? If yes, your investing peculiarities will bite you when you least expect. If no, there’s still time to join the bandwagon, so hop on! Warnings Galore! Concerning the government’s fiscal quagmire, everyone is warning each other. The Fed has warned Congress about the need to raise the debt limit, economists have warned the Fed about the danger of more quantitative easing and hapless credit raters have warned the U.S. government about the potential for credit downgrades. Is anybody listening to each other? Probably not. What would occur if the government failed to increase the debt limit by August 2nd? “It would cause the government to default on its legal obligations – an unprecedented event in American history,” says the U.S. Treasury Department.

### Hitting the debt ceiling would not cause a complete government shut down

Masters 11 **–** Associate Staff Writer for the Council on Foreign Relations (US Debt Ceiling: Costs and Consequences, <http://www.cfr.org/international-finance/us-debt-ceiling-costs-consequences/p24751#p9>) AS

A shutdown takes place when Congress fails to appropriate funds for the current fiscal year, as last occurred in October 1995. In such a case, a specific set of procedures is enacted. A large portion of the federal government--work that is deemed "non-essential"--is suspended indefinitely and workers are furloughed without pay until funding is reestablished. A shutdown does not impede the government's ability to pay interest or principal on its debt as long as Treasury has appropriate headroom under the ceiling. In other words, a shutdown does not precipitate a federal default. If Congress fails to raise the debt limit, the government can no longer borrow funds, but federal operations may continue for the period that Treasury is able to use existing revenue and secure additional resources through special measures. Therefore, most employees will continue to be paid, at least in the short term.

## AT: Japan DA – Alt Caus

### Japanese Aerospace inevitably fails – almost no military R&D investments and too small of a domestic economy to control aerospace firms and corporations

Gordon 2K – [MA in Advanced Japanese Studies](http://www.shef.ac.uk/seas/taughtpostgrad/courses/japanese/advancedjs.html) from the [University of Sheffield](http://www.shef.ac.uk/) in the U.K., [MA in Liberal Studies](http://www.wesleyan.edu/glsp/) degree from [Wesleyan University](http://www.wesleyan.edu/) with a concentration in computerized communications.  MBA in Finance and Accounting and a BA in Economics from [Northwestern University](http://www.northwestern.edu/) (Bill, Japans Aerospace Industry, <http://wgordon.web.wesleyan.edu/papers/aerosp.pdf>) AS

A company's home nation shapes where and how it is likely to succeed in global competition (Porter 1990, 72, 598, 599). After discussing the structure of the Japanese aerospace industry in Section 3 of this essay, Japan's strategies to succeed in the global aerospace industry are analyzed in Sections 4 and 5. ***Factor Conditions*** **Although aerospace companies compete on a global basis**, they almost always carry out production in their home countries and export their products, which makes domestic factor conditions very significant. Factor conditions relate to the factors of production such as human resources, capital resources, physical resources, knowledge resources, and infrastructure. Japan's highly educated population and its very high number of engineering graduates per capita provide Japan a strong advantage. **However, competitiveness in the aerospace industry requires significant R&D investments over many years to obtain the required advanced and specialized factors in knowledge and human resources**. Japan has one of the highest levels of R&D spending of any nation, but almost all of the spending is directed to non-defense areas. **A high level of military R&D spending in aerospace can lead to many direct and indirect benefits for commercial aerospace projects.** For example, the Boeing 747 aircraft, the world's most popular long-range plane, was originally a military aircraft design that lost in a U.S. Government competition for a large military transport plane (Porter 1990, 96). Over many years, Japan has developed its advanced and specialized factors in commercial aerospace through licensed production of U.S. military aircraft and components and through its strengths in manufacturing process technologies. ***Demand Conditions*** Porter's discussion of demand conditions focuses on home country demand conditions for the industry product (Porter 1990, 86-100), and he argues that effectively competing in home country markets builds international competitiveness for firms in the industry. Not only is the nature of domestic demand important, the size of the market is critical to national competitive advantage for industries, such as aerospace, that have significant economies of scale and learning curves. Unlike the huge, extremely competitive Japanese home market for autos, steel, and computers, **Japan does not have a large enough domestic market to support an all-Japanese commercial aircraft.** Although Japanese airlines have built one of the world's largest fleets of long-range passenger jets and have many planes supporting a well-developed domestic commercial air system, **the Japanese market is still much too small to recover the significant investments required for the development of new airplanes and engines**. Although domestic defense-related demand has provided much impetus to Japanese aerospace over the last four decades, Japanese firms have been greatly restricted since 1967 by the government's ban on military product exports. In contrast to Japan, the U.S. dominates aerospace because of very favorable home country demand conditions since the end of World War II. While Japan had a ban on aircraft production from 1945 to 1952, U.S. firms moved early to meet the huge military and commercial aerospace demand. The large demand encouraged U.S. firms to make investments in technology development, large-scale manufacturing facilities, and productivity improvements. The American aerospace industry made significant R&D investments over many years to meet the stringent demands for overseas flights of American international airlines and to meet the demanding performance specifications of the U.S. military. The relatively small domestic market forces Japanese aerospace companies to seek export activities. Since Japan does not produce any indigenous commercial aircraft or engines, the aerospace firms must participate in the worldwide industry as a supplier of components and subsystems. ***Related and Supporting Industries*** **This determinant of national advantage relates to the presence in a country of supplier industries or related industries that are internationally competitive.**

### JAXA is failing now – Akatsuki mission and lack of space tech

Vieru 11 – Science editor on climate change and science (Tudor, JAXA may need to downscale its space ambitions, <http://news.softpedia.com/news/JAXA-May-Need-to-Downscale-Its-Space-Ambitions-173513.shtml>)

**Space analysts in Japan believe that the nation's space agency may need to rethink its long-term space strategy and ambitions, following last week's failure to put a spacecraft in Venusian orbit**. This is the second of two probes to miss its target, after the spacecraft Nozomi swung past Mars in 2003, failing to get captured in a stable orbit. That mission is currently on a heliocentric orbit. Last week, the Akatsuki space probe, the world's first weather satellite around another planet, failed to decelerate sufficiently to be captured in an orbit around Venus, and overshot the planet. According to early calculations, it will take until late 2016 – early 2017 for another orbital insertion attempt to become possible. **These poor results deserve proper scrutiny, experts now say. Even Akatsuki mission scientists believe** that the Japanese AerospaceExploration Agency (**JAXA) should take a close, hard look at its plans, and trim them according to its actual capabilities. “**Our score is zero wins, two losses. We have to be more conservative to plan our next planetary mission, so it will never fail in any aspect,” JAXA official Takehiko Satoh told Space on December 16. The interview was taken at the 2010 annual fall meeting of the American Geophysical Union (AGU), which was held in San Francisco, California, between December 13-17. On December 6, Akatsuki reached a point some 342 miles (550 kilometers) away from its target. Once there, it was supposed to fire its thrusters, get obscured by the planet for a few minutes, then resume communications and enter orbit. But the 22-minute communications blackout turned into a 90-minute one, and once contact was established the JAXA mission control team could see that the spacecraft was speeding away from its intended target. According to Satoh, JAXA experts still have no idea why the thrusters misfired. “The pressure decrease was the direct cause. But we don't know why the pressure shut down,” he said. The expert added that the Akatsuki team is relatively optimistic about the second orbital insertion attempt. “Everybody thought Hayabusa was unrecoverable. We now share that never-give-up-spirit with the Hayabusa team,” he explained. The Hayabusa sample-return flight spent years traveling to the asteroid Ikotawa, and then returning home. Nearly everything that could have failed on it did, yet the sample chamber was safely returned to Earth this June. “With Mars exploration, so many scientists want a big lander or a big rover. If we had previous successes with planetary orbital insertions, we might say, OK, we'll try something big,” Satoh said. “**But now, maybe we can do an orbiter and a very small lander or a small rover,” he added, saying that JAXA could learn a lot from NASA and the European Space Agency.**

### JAXA credibility on the line – H-2A rocket triggers impact not the plan

Yoimimuri 04 – Staff Writers for the Daily Tokyo (Shimbun, Jaxa’s credibility on the line, <http://www.lexisnexis.com.proxy.lib.umich.edu/lnacui2api/results/docview/docview.do?docLinkInd=true&risb=21_T12302239011&format=GNBFI&sort=RELEVANCE&startDocNo=1&resultsUrlKey=29_T12302239018&cisb=22_T12302239017&treeMax=true&treeWidth=0&csi=145202&docNo=4>)

**The credibility of** the Japan Aerospace Exploration Agency (**JAXA) will face a crucial test in February, when it resumes launches of the H-2A rocket**. The launches have been suspended for more than a year following a failed liftoff in November 2003. **Their success is key to the reputation of the agency, which has made every possible effort to restore its image after a string of launch failures involving rockets and satellites**. The countdown to the launch of H-2A No.7 will begin soon. The previous failures have changed the mind-set of **JAXA** engineers, resulting in stepped-up inspections and more thorough tests. Together with engineers from Mitsubishi Heavy Industries, Ltd., which is responsible for the rocket's production, **JAXA** engineers have examined the entire rocket and made a significant review of the design. They examined not only the areas around the solid rocket booster, which was the cause of the previous failure, but also identified 786 problematic parts, including those thought to have a low possibility of malfunction, which they disregarded in the past. They have almost finished improving 77 parts, including devices related to the ignition, for the redevelopment of the first rocket. In July, **JAXA** established an office staffed by six experts on quality control from Toyota Motor Corp. and Japan Airlines to improve the agency's image. By doing so, **JAXA** hopes to learn from JAL, which averages one accident per million flights, and the nation's top automaker, which is known for its high quality control. **JAXA's** budget for this fiscal year came to 179.2 billion yen, a decline of 45 billion yen from its peak six years ago. With budget cuts continuing, the Education**, Science and Technology Ministry has abandoned a plan to develop new science satellites, instead deciding to concentrate on improving launches of the H-2A rocket and related satellites.** Kimikazu Iwase, section chief of the ministry's Space Development and Utilization Division, said every project would come to a halt if H-2A rocket launches continued to fail. If **the H-2A No. 7 can make the first step in restoring** **JAXA's credibility, plans to improve the rocket and for satellite launches will be carried out.** **JAXA** plans to launch an advanced land-observing satellite next summer that uses a one-stage liftoff thrust engine the agency has been developing for three years. After that, multifunctional transport satellite No. 2 and an information-gathering satellite will be launched. However, there are no launch plans after fiscal 2008.

## AT: Japan DA – Economy Takeouts

### No Impact - Japanese Tsunami destroyed the economy for the next couple of years – banking collapse, reconstruction costs, and business interest

Lohr 11 **–** Staff Writer for the New York Times and previous editor (Steve, Disruptions of power and water threaten Japans economy, <http://www.nytimes.com/2011/03/14/business/global/14yen.html?pagewanted=1&_r=1>) AS

**As the humanitarian and nuclear crises in Japan escalated after the devastating earthquake and tsunami, the impact on the country’s economy appeared to be spreading as well.** While the nation’s industrial clusters in the south and west seemed to be spared the worst, the crisis at damaged nuclear plants north of Tokyo was threatening to cause an energy squeeze that could set back all sectors of Japan’s economy. To help bring electricity back to the devastated areas, utilities across Japan are cutting back and sharing power, imposing rolling blackouts that will affect factories, stores and homes throughout the nation. The emergency effort is expected to last up to two weeks, but could take longer. “The big question is whether this will seriously affect Japan’s ability to produce goods for any extended period of time,” said [Edward Yardeni](http://topics.nytimes.com/top/reference/timestopics/people/y/edward_yardeni/index.html?inline=nyt-per), an independent economist and investment strategist. The bleak outlook prompted a 6.2 percent plunge in the Nikkei 225 stock index in Tokyo on Monday, as companies from Sony to Fujitsu to Toyota scaled back operations. **The Bank of Japan, in an effort to preempt a further deterioration in the economy, eased monetary policy on Monday by expanding an asset buying program. ‘**‘The damage of the earthquake has been geographically widespread, and thus, for the time being, **production is likely to decline and there is also concern that the sentiment of firms and households might deteriorate,’’ the central bank said in a statement.** To try to stabilize the markets and prop up the economy, the central bank earlier Monday poured money into the financial system. Assembly plants for Japan’s big three automakers — [Toyota](http://topics.nytimes.com/top/news/business/companies/toyota_motor_corporation/index.html?inline=nyt-org), [Honda](http://topics.nytimes.com/top/news/business/companies/honda-motor-co-ltd/index.html?inline=nyt-org) and Nissan — were closed on Sunday and planned to remain closed on Monday. Toyota said that its factories would be closed at least through Wednesday. Automakers said some plants experienced damage that was not extensive, but **damage to suppliers and to the nation’s transport system and infrastructure was expected to affect their ability to make and move their products.** Japan’s economic outlook, already problematic, is now even more uncertain, economists and analysts say, because the dimensions of the disaster remain unclear, especially at the damaged nuclear plants. “The Japanese economy threatens to suffer another bout of [recession](http://topics.nytimes.com/top/reference/timestopics/subjects/r/recession_and_depression/index.html?inline=nyt-classifier),” said Mark Zandi, chief economist of [Moody’s](http://topics.nytimes.com/top/news/business/companies/moodys_corporation/index.html?inline=nyt-org) Analytics. Economic activity in Japan contracted in the fourth quarter of 2010, and the country was overtaken by China as the world’s second-largest economy, after the United States. Activity may well shrink for the first half of this year, Mr. Zandi said, though he predicted that the rebuilding efforts in the aftermath of the quake would help provide a rebound in the second half. **Rebuilding costs that could run in the tens of billions of dollars may require Japan to make tough decisions about government spending, economists say. Its ratio of government debt to the economy’s annual output is already at 200 percent, the highest among industrialized nations and far higher than in the United States,** for example. So reconstruction, economists say, may make cuts in government spending elsewhere a necessity. The yen is expected to strengthen against [the dollar](http://topics.nytimes.com/top/reference/timestopics/subjects/c/currency/dollar/index.html?inline=nyt-classifier), as Japanese investors bring money back from overseas to shore up their savings and provide money for the rebuilding campaign. Those financial flows back into Japan will drive up demand for [the yen](http://topics.nytimes.com/top/reference/timestopics/subjects/c/currency/yen/index.html?inline=nyt-classifier), increasing its value. After the Kobe earthquake in 1995, the yen rose about 20 percent against the dollar over a few months. One ripple effect could be a reduction in demand for [United States Treasury](http://topics.nytimes.com/top/reference/timestopics/organizations/t/treasury_department/index.html?inline=nyt-org) bonds, adding pressure to American interest rates, according [Byron R. Wien](http://topics.nytimes.com/top/reference/timestopics/people/w/byron_r_wien/index.html?inline=nyt-per), vice chairman of Blackstone Advisory Partners. The Japanese have been large buyers of United States bonds, but, Mr. Wien said, “they are going to be using their money to rebuild, so they will be smaller buyers of our debt securities.” If energy curbs and infrastructure damage hinder production in a significant way, it could harm Japanese companies and affect consumers abroad. Japanese automakers have shifted much of their manufacturing overseas in recent years. But some popular models are still made in Japan for export, including [fuel-efficient](http://topics.nytimes.com/top/reference/timestopics/subjects/f/fuel_efficiency/index.html?inline=nyt-classifier) cars like the [Toyota Prius](http://autos.nytimes.com/2010/Toyota/Prius/286/3326/310054/researchOverview.aspx?inline=nyt-classifier) and the [Honda Fit](http://autos.nytimes.com/2010/Honda/Fit/248/10516/320408/researchOverview.aspx?inline=nyt-classifier). **Disruptions in exports could hurt sales at a time when rising gasoline prices have increased demand for those cars in the United States.**

### Unstable Dollar is wrecking the Japanese Economy

Tabuchi 11– Staff writer for the New York Times (Dollar hits low against yen, dealing blow to Japanese economy, <http://www.nytimes.com/2010/08/12/business/global/12yen.html>) AS

The dollar sank to a 15-year low against [the yen](http://topics.nytimes.com/top/reference/timestopics/subjects/c/currency/yen/index.html?inline=nyt-classifier) on Wednesday, as the [Federal Reserve](http://topics.nytimes.com/top/reference/timestopics/organizations/f/federal_reserve_system/index.html?inline=nyt-org)’s pessimistic [view of the American economy](http://www.nytimes.com/2010/08/11/business/economy/11fed.html) prompted investors to sell the American currency for safer assets. **The strengthening yen comes as a further blow to a Japanese economy that is suffering the effects of** [**deflation**](http://topics.nytimes.com/top/reference/timestopics/subjects/d/deflation_economics/index.html?inline=nyt-classifier)**.** The dollar, which has declined more than 10 percent against the yen in the last three months, dropped to 84.72 yen on the Electronic Brokering Services trading platform late Wednesday — the lowest level since April 1995, when [the dollar](http://topics.nytimes.com/top/reference/timestopics/subjects/c/currency/dollar/index.html?inline=nyt-classifier) hit a low of 79.75 yen in the aftermath of the 1985 Plaza Accords, the coordinated effort between major economies to depreciate the dollar. In Japan, the dollar’s decline has ignited fears that too strong of a domestic currency could harm the country’s recovery, led by exporters like [Toyota](http://topics.nytimes.com/top/news/business/companies/toyota_motor_corporation/index.html?inline=nyt-org). The yen tends to strengthen against other currencies despite a weak economy at home because Japan still runs a current-account surplus, making a run on the currency unlikely. The yen’s strength has also fueled speculation that the Japanese government may intervene to weaken its currency. **A strong yen hurts Japanese exporters by making their goods more expensive overseas and by eroding the value of their repatriated earnings. Japanese officials have held off suggesting that an currency intervention is in the works — a maneuver Tokyo has avoided since March 2004. On Wednesday, the Japanese finance minister, Yoshihiko Noda, said he was “closely watching” currency markets.** Indeed, many analysts do not expect Japan to intervene. To be effective, such intervention requires international coordination; moreover, Tokyo has supported Washington’s efforts to pressure China to let its currency appreciate, as part of a commitment among the world’s largest economies to let market forces determine currency levels. With intervention unlikely, the onus has fallen on the [Bank of Japan](http://topics.nytimes.com/top/reference/timestopics/organizations/b/bank_of_japan/index.html?inline=nyt-org) to shore up the country’s faltering economy. The dollar-yen exchange rate is closely correlated with the spread, or difference, between interest rates in the United States and Japan, so by lowering interest rates in Japan, the central bank could help ease the upward pressure on the yen. Pressure increased on the Bank of Japan to act after steps announced by Federal Reserve on Tuesday reinforced expectations that American interest rates would remain at record lows for some time. The Fed’s plan to buy government debt drove down yields in the[Treasury](http://topics.nytimes.com/top/reference/timestopics/organizations/t/treasury_department/index.html?inline=nyt-org) markets, narrowing the spread with Japan, which was a factor in the yen’s spike on Wednesday. But Japan’s interest rates are already near zero, limiting the central bank’s policy options. The bank also maintains that the economy is “gradually recovering,” making it difficult for policy makers to justify further monetary easing. At the end of a policy meeting on Tuesday, the bank announced it would leave monetary policy unchanged. “The yen has appreciated to the level at which the B.O.J. has taken actions in the past,” Yunosuke Ikeda, a strategist for [Nomura](http://topics.nytimes.com/top/news/business/companies/nomura-holdings-inc/index.html?inline=nyt-org), wrote Wednesday in a research note. “However, we see no sign that the B.O.J. is very concerned about the economy’s downside risks.” “We believe it is unlikely that the B.O.J. would take additional easing steps any time soon,” Mr. Ikeda said, but added that the central bank could get more serious about taking action if the Japanese currency were to hit levels closer to 82 yen to the dollar.

## AT: Politics – Plan Popular

### US space leadership is popular

Pew Research Center 7/5 - survey research group

Pew Research Center “Majority Sees U.S. Leadership in Space as Essential, Shuttle Program Viewed as Good Investment” July 5, 2011 <http://people-press.org/2011/07/05/majority-sees-u-s-leadership-in-space-as-essential/1/>

On the eve of the final mission of the U.S. space shuttle program, most Americans say the United States must be at the forefront of future space exploration. Fifty years after the first American manned space flight, nearly six-in-ten (58%) say it is essential that the United States continue to be a world leader in space exploration; about four-in-ten say this is not essential (38%). Looking back on the shuttle program, a majority (55%) say it has been a good investment for the country. However, this is lower than it was in the 1980s; throughout the early years of the shuttle program, six-in-ten or more said the program was a good investment Majorities in nearly all demographic groups say it is essential that the U.S. continue to be at the vanguard of space exploration. And partisan groups largely agree that American leadership is vital, although this view is more prevalent among Republicans. Two-thirds of Republicans (67%) say the nation must continue to play an international leadership role in space exploration; smaller majorities of Democrats (54%) and independents (57%) say this.

## AT: International Negotiation CP – Delay

### Long time-frame and permutation solves

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:  The SBSP Study Group found that no outright policy or legal showstoppers exist to prevent the development of SBSP. Full‐scale SBSP, however, will require a permissive international regime, and construction of this new regime is in every way a challenge nearly equal to the construction of the satellite itself. The interim review did not uncover any hard show‐stoppers in the international legal or regulatory regime. Many nations are actively studying Space‐Based Solar Power. Canada, the UK, France, the European Space Agency, Japan, Russia, India, and China, as well as several equatorial nations have all expressed past or present interest in SBSP. International conferences such as the United Nations‐connected UNISPACE III are continually held on the subject and there is even a UN‐affiliated non‐governmental organization, the Sunsat Energy Council, that is dedicated to promoting the study and development of SBSP. The International Union of Radio Science (URSI) has published at least one document supporting the concept, and a study of the subject by the International Telecommunications Union (ITU) is presently ongoing. There seems to be significant global interest in promoting the peaceful use of space, sustainable development, and carbon neutral energy sources, indicating that perhaps an open avenue exists for the United States to exercise “soft power” via the development of SBSP. That there are no show‐stoppers should in no way imply that an adequate or supportive regime is in place. Such a regime must address liability, indemnity, licensing, tech transfer, frequency allocations, orbital slot assignment, assembly and parking orbits, and transit corridors. These will likely involve significant increases in Space Situational Awareness, data‐sharing, Space Traffic Control, and might include some significant similarities to the International Civil Aviation Organization’s (ICAO) role for facilitating safe international air travel. Very likely the construction of a truly adequate regime will take as long as the satellite technology development itself, and so consideration must be given to beginning work on the construction of such a framework immediately. o Recommendation: The complexity of negotiating any type of international legal and policy agreements necessary for the development of SBSP will require significant amounts of time **(5 – 10 years).** The SBSP Study Group recommends that the policy and legal framework development **should begin simultaneously** with any science and technology development efforts to ensure that intangible issues do not delay employment of technology solutions.

### An international approach substantially slows development

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:  The SBSP Study Group found that although there was universal agreement that international cooperation was highly desirable and necessary, there was significant disagreement on what form the cooperation should take. There are multiple values to be balanced with respect to international cooperation. The various goods to be optimized include efficiency, speed of development, cost savings, existing alliances, new partnerships, general goodwill, American jobs and business opportunities, cooperation, safety & assurance, commercial autonomy, and freedom of action.  Adding more and new partners may increase goodwill, but **add additional layers of approval and slow development**.  Starting with established alliances and shared values fulfills some expectations and violates others. The spectrum of participation ranges from beginning with a demarche before the UN General Assembly, to privately approaching America’s closest allies, to arranging multi‐national corporate conferences. Many participants felt the International Space Station (ISS) overvalued cooperation for cooperation’s sake, and **took mutual dependency too far**.

## AT: Private Sector CP

### Private approaches are doomed to failure – too much up-front capital required

Preble 10 – MS in Physics and System Management

Darel Preble, MS in Physics and System Management, consulting positions with Booz Allen Hamilton, Digicon and the United States Forces Command, 12-2010, “The Sunsat Act - Transforming our Energy, Economy and Environment,” Online Journal of Space Communication, http://spacejournal.ohio.edu/issue16/preble.html

**No company, utility or agency** today is prepared to assume the immense business risk involved in creating and launching a space solar power system. The tens of billions in financing required and the painfully slow payback time places SSP in the venture capital "Valley of Death." There are still too many engineering, financial, and regulatory risks. Like building or financing the Hoover Dam or the Transcontinental Railroad, **private enterprise will need** some **help** bringing this much needed public utility to operational reality. Expecting an individual utility to construct an untested new power source is probably illegal. Since utilities are public trusts, they would not likely engage in the high-risk work necessary to build the first sunsats. Similarly, requiring utilities to reduce their CO2 footprint would be fruitless unless there is a trustworthy path forward. Wind mills and ground solar, for example, cannot be expected to replace baseload coal and nuclear power plants, which have to be scheduled. Only Congress imagines they can schedule wind or sun. There is also no economic way to store massive quantities of electric power; i.e., California can't be run on "batteries" charged from wind power. To expect it to do so would force its utilities to either destabilize their grid or to greatly increase costs to their customer base. SSP provides a real alternative to cut costs and improve reliability with its unexcelled power generation characteristics, but such an innovation must be scheduled. No one builds a multi-billion dollar nuclear plant or other baseload plant without being certain of having a customer base. That is why deregulation of energy utilities was such a hoax on the American people. In a deregulated environment new generation capacity and new transmission lines can not be built because the return of the principal and interest can not be assured.[16] To do so would place more debt on the public for needed services than would ever be acceptable. Major electric power utilities are the most capital intensive businesses in the world, meaning they require more dollars to be invested in concrete and steel to earn a dollar that any other business. Companies in several countries are pursuing SSP, including China, Europe and the United States. In the U.S., Solaren has a contract approved by the California PUC, to provide its PG&E utility with 200 megawatts of space solar power starting in 2016. In a press release, PG&E said the price would exceed 12.9 cents a kilowatt-hour.[17] Note that PG&E has invested nothing and accepted no risk. Solaren is planning for $100 million in first round financing. Expecting private companies to build SSP alone is problematic. Solaren will need to raise ten to forty billion in financing.

### More evidence – private companies can’t do it

Krauthammer 10 – Pulitzer Prize Winner

Charles, MD and Pulitzer Prize-Winning Columnist, “Closing the New Frontier”, 2-12, <http://culberson.house.gov/preserving-americas-leadership-in-space/>

Of course, the administration presents the abdication as a great leap forward: Launching humans will be turned over to the private sector, while NASA’s efforts will be directed toward landing on Mars. This is nonsense. It would be swell for **private companies** to take over launching astronauts. But they **cannot do it.** It’s too expensive. It’s too experimental. And the safety standards for getting people up and down reliably are just unreachably high. Sure, decades from now there will be a robust private space-travel industry. But that is a long time. In the interim, space will be owned by Russia and then China. The president waxes seriously nationalist at the thought of China or India surpassing us in speculative “clean energy.” Yet he is quite prepared to gratuitously give up our spectacular lead in human space exploration.

## AT: Private Sector CP – “NSSO”

### \*\*\*They will likely read the preceding paragraphs\*\*\*

### Only works with an up-front federal investment

NSSO 7

National Security Space Office, Report to the Director, 10-10-2007, “Space-Based Solar Power As an Opportunity for Strategic Security; Phase 0 Architecture Feasibility Study,” NSS, http://www.nss.org/settlement/ssp/library/final-sbsp-interim-assessment-release-01.pdf

FINDING:  The SBSP Study Group found that SBSP systems are unlikely to become economically competitive, nor produced on the scale that is needed to help solve global energy and environmental problems unless the systems are manufactured, owned, and operated by private industry. This finding is consistent with the U.S. National Space Policy that advocates space commercialization. o Recommendation: The SBSP Study Group recommends that consistent with the U.S. Government incentives provided to other carbon‐neutral energy technologies, it is critical for the U.S. Government to provide similar incentives to encourage private U.S. industry to co‐invest in the development of SBSP systems. Specifically, the following incentives should be provided to U.S. industry as soon as possible to encourage private investment in the development and construction of SBSP systems:  Legislation at both the federal and state level that specifies — and clarifies existing law as specifying — that SBSP is eligible for all pollution credits, carbon credits, and carbon off‐sets that are available to other clean and renewable energy sources such as wind, hydro, ground solar, and nuclear  A federal loan guarantee program of up to 80% should be created for U.S. companies engaged in the business of developing, owning and operating SBSP systems. This program should either be an extension of, or modeled after, the existing loan guarantee program provided to the nuclear power industry.  The U.S. Government should enact a 30‐year tax holiday on any profits made by U.S. industry in the successful operation of space‐based solar power systems. o Recommendation: The SBSP Study Group recommends that the US Government should task one or more federal civilian agencies with expertise in commerce and industry for developing, evaluating, and recommending additional incentives for private industry investment in SBSP.

### \*\*\*Next Paragraph\*\*

o Recommendation:  The SBSP Study Group recommends that in order to reduce risk and promote commercial development of SBSP, the U.S. Government needs to invest in the **development and demonstration of key technologies needed by SBSP systems**.

## AT: Private CP – Too Slow

### Private industry fails and moves too slowly

Vedda 7 – PhD in Political Science @ Florida

James Vedda, The Role of Space Development in Globalization, in Societal Impact of Space Flight, Scholar

Friedman believes that the current system of globalization "has come upon us far faster than our ability to retrain ourselves to see and comprehend it."16 Certainly this has been the case with space development. As in other societal activities, space-related institutions seek to continue their existence and their traditional priorities despite the fast pace of change in key segments of their environment. Since the end of the Apollo era, for example, U.S. civil space efforts have struggled with questions on the role of government vs. the private sector, made all the more difficult by the fact that the answers are moving targets.Who should finance, build, and operate space infrastructure elements such as launch systems and space stations? To what extent should the government support research projects that have the potential to produce private-sector revenues? In an era of tight federal budgets, should the government shift as much responsibility and expertise as possible to the private sector, or is this a short-sighted strategy that will undermine the nation's continuing need for large-scale, evolving space capabilities? Can the private sector, at the current stage of technical development, always be counted on to choose better space investments and technical approaches than the government? A significant percentage of the space industry is **designed to serve governments**, since these constitute much of the customer base in key areas such as space hardware manufacturing and launch services. The relatively small number of competitors and customers in these areas, and the dominance of government customers, yield a space industry that is **slower to adapt and innovate** than most other high-tech industries. The tendency to protect space technologies as sensitive national assets slows their adoption in the world market and may hinder the competitiveness of nations employing export restrictions and protectionist measures. These circumstances **do not bode well for the U.S. space community's ability to rapidly adapt** to the globalized environment.

## AT: International CP – Doesn’t Solve Competitiveness

### Doesn’t solve competitiveness

Smith 11 – Colonel, PhD Candidate @ Reading in UK

Colonel M.V. Smith, PhD student in the strategic studies program under Professor Colin Gray at the University of Reading in the UK, former Chief of Future Concepts (Dream Works) for the National Security Space Office at the Pentagon, 3-2011, Comment on a Space Review article written by Christopher Stone (MBA Georgetown), http://www.thespacereview.com/article/1797/1

Mr Stone makes a brilliant point in this article that I'd like to highlight and emphasise. "American leadership in space" does NOT imply dominance or hegemony, as many detractors assert. It simply means being the best at spacefaring activities. Unless America is recognised as the **best at key spacefaring capabilities**, no one will care to partner with us for any reason other than to constrain our freedom of action and to pick our pockets of classified data and intellectual property. Being the best means doing things routinely that others cannot, and promoting the operational and industrial bases that produce such performance. Ignoring the strategic importance of national spacepower across the civil and security sectors has resulted in failure to make timely decisions. As Mr Stone points out, we now have no way to lift astronauts to the ISS, but we also have allowed our space industrial base to atrophy in several critical areas. Great care must be taken to ensure the implementation of the Obama administration's space policy does not result in US tax dollars being spent to create **aerospace jobs in foreign countries**. We must not forget that the geopolitical and economic environment on Earth is far more congested, contested, and competitive than space ever will be!

## AT: Private Sector CP

### The private sector is too risk averse to invest without up-front government investment

AEIC 10 **–** American Energy Innovation Council, consisting of preeminent energy and innovation experts and is staffed jointly by the Bipartisan Policy Center and the ClimateWorks Foundation

“A Business Plan for America's Energy Future” p. 12 <http://www.americanenergyinnovation.org/full-report>

Why can’t the private sector solve this problem? The private sector has underinvested in energy innovation, and it cannot achieve these goals alone. There are fundamental differences between energy and most other economic sectors, and these differences limit the ability of the private sector to solve large-scale energy problems **on its own**. First, the high price of inaction highlights the need for the public to invest in better energy options. National security, national economic strength, and the environment are not primary drivers for private sector investments, but they are critical for the health of our country. They merit a public commitment. Second, large-scale deployment of many new energy technologies requires **massive capital expenditures** that are **too risky for private investors**. A new generation of microwave technology might cost $10 million to develop and can be built on existing assembly lines. That risk-reward calculus makes business sense. In contrast, a new electric power source can cost several billion dollars to develop, yet still will carry risk of technology failure or regulatory changes. And the product, electricity, is sold into a generic market that does not differentiate between clean and dirty sources. So that investment does not make sense for most companies. Third, America’s long-term corporate R&D budgets, especially those run by utilities, have been in decline for several decades. Fourth, the turnover in the electrical generation system is very slow. Power plants last 50 years or more and are relatively cheap to run once built, so there is little market for new models. Moreover, patents for replacement technology last only 20 years, so the slow power plant turnover considerably reduces the reward for inventors. Combine these elements and it becomes clear why private sector investments in clean energy technology development have been so small. Once businesses see a market situation that **reduces their technology development** risk and rewards clean energy sources, **they will invest**.

### Up-front investment is the only way to get private sector investment

Hickman 99-- Associate Professor of Government at Berry College in the Department of Government and International Relations

November 1999 “The Political Economy of Very Large Space Projects” in the JOURNAL OF EVOLUTION AND TECHNOLOGY. <http://www.transhumanist.com/volume4/space.htm>

Attempting to persuade investors to risk enough capital to finance the construction of a very large space development project would run up against the same capitalization problems now faced by entrepreneurs seeking capital for ordinary space development projects such as launching communication satellites. Investors and lenders seek to maximize economic returns from capital while avoiding risk. The cost of capital is higher for riskier investments. Persuading investors and lenders to part with their capital requires making credible promises that they will receive better returns than they would have received from making alternative investments during the same time period commensurate with risk. While investors often accept higher levels of risk than do lenders, they do so in the expectation of even better returns. Ordinary space development projects confront not only the risks that their businesses might not make money and that the technology might fail to work as projected, but also that they might not attract enough investment because the necessary capital investment is too “chunky.” In other words, the “**up-front” capital investment** necessary to proceed with even an ordinary space development project tends to be relatively large and to take a relatively long time period before generating cash flows or profits (Simonoff 1997: 73-74; U.S. Department of Commerce 1990: 55-60; McLucas 1991). It is important for the subsequent discussion that the reader note that many investors typically understand the phrase “long time period” to mean “5 years” (Marshall and Bansal 1992: 99-100). If attracting capital for projects using proven technologies like communications satellites remains difficult, imagine the difficulty of attracting sufficient capital to construct a mining facility on the Moon or terraforming Mars or Venus. Such projects are extraordinarily “chunky” in that they would require massive amounts of capital to be invested “up front” and would take long or very long time periods before generating economic returns. The total amount of capital available for investment in anything is finite and the private investors and lenders who control most of it normally enjoy multiple investment opportunities. Investors and lenders are typically reluctant to concentrate their risks on a single project. Investors and lenders are also reluctant to lock up their capital in very long time investments or loans because this increases their opportunity costs.

### Previous restrictions makes aerospace totally reliant on government investment

ICAF 7

he Industrial College of the Armed Forces, a senior service school providing graduate level education to sernior members of the US armed forces, Spring “The Final Report: The Space Industry” Industrial College of the Armed Forces, http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA475093&Location=U2&doc=GetTRDoc.pdf

The U.S. government has long understood that access to space and space capabilities are essential to U.S. economic prosperity and national security. U.S. space policy from 1962 to 2006 served to ensure national leadership in space and governance of space activities, including science, exploration, and international cooperation. The current Administration has issued five space-specific policies to provide goals and objectives for the U.S. Space Program. In addition to the National Space Policy, these policies are Space Exploration; Commercial Remote Sensing; Space Transportation; and Space-Based Positioning, Navigation, and Timing. Each policy endeavors to maintain U.S. space supremacy, reserving the right to defend assets in space, and to continue to exploit space for national security and economic prosperity. 9 America’s success in space is dependent on government involvement, motivation, and inspiration. It is significant that the Bush Administration has taken the time and effort to update all of the U.S. space policies. The consolidation of the major space industry players and a general down-turn in the commercial space market demand, coupled with export restrictions, has left the U.S. space industry **reliant on the government for revenue and technology development.**

## AT: Regulations CP

### Regs collapse the economy

Green 10 – PhD in Environmental Science from UCLA

Kenneth, “ENERGY CHALLENGES; COMMITTEE: HOUSE SELECT ENERGY INDEPENDENCE AND GLOBAL WARMING,” CQ Congressional Testimony, Lexis

And the money and attention that we are spending on mitigation efforts is largely wasted - even if we shut the U.S. and the EU down completely, the trajectory of emissions from China and India will negate the environmental benefit of our self-sacrifice in only a few years. The fact is, mitigation is immiseration. Let's start with cap-and-trade, which, while seemingly dead, could come back to haunt us in the future, or under other guises. For emission trading to work certain conditions must apply: you need readily available technology to capture emissions, or less emission-intensive input fuels. You need a single regulatory jurisdiction; you need a single trading currency that can't be manipulated; you need the ability to confirm emission reductions; you need a manageable number of actors, preferably uniformly distributed; and you need to auction all permits to prevent rampant corruption of the scheme by rent-seekers and special interests. Those conditions allowed emission trading in sulfur dioxide to work, but they are **virtually non-existent** when it comes to carbon dioxide. Even the economists who first developed the theory and practice of cap and- trade have said that it is not a suitable mechanism for greenhouse gas control. It hasn't worked in Europe, and it won't work here. All that cap-and-trade will do is raise energy costs, and raise the costs of goods and services. This will reduce consumption, leading to job losses and weaker international competitiveness for US firms. The same is true of EPA's misguided efforts to use regulation to force down emissions of greenhouse gas emissions. There are few, if any, affordable, economically sustainable ways for major power producers or consumers to accomplish that task. The methods available to them (mostly a matter of switching from coal to natural gas for producing energy and fueling boilers) will render many businesses uncompetitive both domestically and internationally. The idea that there are efficiency gains just laying around for companies to capture is a form of economic delusion. The ground is not littered with twenty and hundred dollar bills. Firms are not so stupid as to leave real potential gains from efficiency uncaptured.

### Regulations fails – three reasons

-complex to the point of uselessness

-regulation slippage

-only leads to quick fixes that do not address the underlying problem.

Speth 8

James, dean of the [Yale School of Forestry and Environmental Studies](http://en.wikipedia.org/wiki/Yale_School_of_Forestry_and_Environmental_Studies) at [Yale University](http://en.wikipedia.org/wiki/Yale_University), [New Haven, Connecticut](http://en.wikipedia.org/wiki/New_Haven,_Connecticut). Currently he serves the school as the Carl W. Knobloch, Jr. Dean and Sara Shallenberger Brown Professor in the Practice of Environmental Policy. The Bridge at the Edge of the World. P. 84-85

Second, environmental issues are increasingly complex and scientifically difficult, and they are increasingly chronic and often subtle, slow to unfold. The public has a harder time with these newer issues than the more obvious issues of the 1970s. There are other dimensions to increasing complexity. Environmental protection efforts have spawned a huge and impenetrable regulatory and management apparatus. Environmental regulations today are quite literally beyond comprehension. Who among us knows what’s going on with the “prevention of significant deterioration” regulations that are to protect western vistas or the “total maximum daily load” regulations under the Clean Water Act or the “new source review” of power plants or the implementation of the Supreme Court’s decision on wetlands protection? All these are significant issues with relatively high profiles, but they are hard to follow, and even environmental professionals have difficulty keeping up when they move out of their specialties. At the international level, the complexities of the Kyoto Protocol rules also call for death defying skill and determination. The problem of technical complexity is matched only by political complexity when one moves—as one must—into the international arena, where efforts to frame accords must cope with the north-south divide, development versus environment, northern consumption growth versus southern population growth, and the exclusion of citizens’ groups from meaningful roles, all in a world of about two hundred nations claiming sovereignty, demanding to be heard, and pursuing their national interests. This increasing complexity weakens an already weak environmental politics. Third, there is the regulatory slippage problem—the problem of the slip twixt cup and lip—inherent in today’s policy reform approaches. What if a regulation covered 80 percent of the problem, and 80 percent of those regulated tried to comply, and 80 percent of that effort was successful? Oops, 0.8 × 0.8 × 0.8: EPA just missed 50 percent of the problem. And the problem is growing, driven as we have seen by economic expansion. If a regulation controls 50 percent of an effluent but the sources producing effluents double in size, pollution is right where it was before the regulation. And there are more and more problems. Steve Pacala and his coauthors writing in Science in 2003 point out another reason much of the problem can be missed: “Problems of detecting warning signals and overcoming vested interests inevitably lead to delay in regulation, often incurring damages that could have been prevented with higher sensitivity” to environmental alarms.41 Fourth, there are the limits that stem from the pragmatic, compromising, deal-with-the-effects approach of modern environmentalism. That approach often leads to quick fixes and to picking the low-hanging fruit. Quick fixes address symptoms, not the underlying causes.42 They don’t get at the problem and can thus mask what needs to be done. Building codes can make homes more efficient, but what if consumers and builders want ever-larger homes? Auto efficiency standards can be tightened, but what if consumers drive more and more miles in part because good rapid transit options do not exist? Picking the low-hanging fruit can yield gains that are politically easy and economically attractive, but as the situation looks improved and becomes more tolerable—like the U.S. environment today—and as the costs of further improvement mount, support can melt away, and environmental leaders can find themselves trapped and unable to move forward with the job half done. And given the tendency of environmentalists—and almost all other communities of interest—to work mainly with themselves, when one does get trapped, there are few friends to help out.

## AT: Nuclear Power – Uniqueness

### Future development triggers the link

**Sovacool\* & Cooper\*\* 8**

Benjamin K,\* Adjunct Assistant Professor at the Virginia Polytechnic Institute and State University, Research Fellow in the Energy governance program and a former advisor of the US Department of Energy’s climate Technology Program & Christopher\*\*, former Executive Director of the Network for New Energy Choices.

Nuclear Nonsense: Why Nuclear power is no Answer to Climate Change and the World’s Post-Kyoto Energy Challenges,” Scholar

Despite all of the recent efforts to research, design, plan, construct, operate, and upgrade nuclear power plants, transitioning to an energy economy based on significant expansions in nuclear power would bring disastrous consequences. This section will document how nuclear power plants create massive external costs not subsumed by ratepayers or even present generations. Nuclear facilities rely almost entirely on government subsidies for construction, storage, and liability. While, historically, the costs of nuclear power plants appear to be low, in the near future the cost of building new nuclear plants will be outrageously high, and the promise of Generation IV reactors are entirely theoretical and will require billions of dollars of further R&D before the industry can construct even an experimental reactor.

## AT: Nuclear Power – Energy Indep.

### Doesn’t solve energy independence

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Accidents, severe weather, and bottlenecks can all prevent uranium from being adequately distributed to nuclear facilities in desperate need of fuel. Nuclear plants increase a country’s dependence on imported uranium and subject electricity consumers to large price spikes. The cost of uranium, for instance, jumped from $7.25 per pound in 2001 to $47.25 per pound in 2006, an increase of more than 600%.305 The NEA reports 200 metric tons of uranium are required annually for every 1000 MW reactor and that uranium fuel accounts for 15% of the lifetime costs of a nuclear plant, meaning that price spikes and volatility can cost millions of dollars.306 In 2000, the DOE “quietly acknowledged that domestic uranium production is currently at about 10% of its historical peak, and that most of the world’s uranium reserves are becoming ‘stranded,’ and therefore much more difficult to extract.”307 The result is that investments in new nuclear plants would only make the U.S. more dependent on foreign deposits of uranium in Africa, Russia, Canada, and Australia.308 Admittedly, the chance that Canada and Australia will band together to become the new “OPEC of uranium” is as unlikely as it sounds, but Kazakhstan, Namibia, Niger, and Uzbekistan together were responsible for more than 30% of the world’s uranium production in 2006.309 Over the past several years these countries have suffered from autocratic rule and political instability. 310 It is not inconceivable to imagine a scenario in which unstable or hostile regimes controlling only 30% of the world’s supply of uranium could nonetheless induce price spikes and volatility in uranium supplies that could have devastating consequences to the West.

## AT: Nuclear Power – Warming

### Doesn’t solve warming

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From a climate-change standpoint, nuclear power is not much of an improvement over conventional coal-burning power plants, despite recent claims by the Nuclear Energy Institute that nuclear power is the “Clean Air Energy.”424 Reprocessing and enriching uranium requires a substantial amount of electricity, often generated from fossil fuel-fired power plants, and uranium milling, mining, leeching, plant construction, and decommissioning all produce substantial amounts of greenhouse gas.425 In order to enrich natural uranium, for example, it is converted to uranium hexafluoride, UF6, and then diffused through permeable barriers. 426 “In 2002, the Paducah [uranium] enrichment plant [in Kentucky] released over 197.3 metric tons of Freon[, a greenhouse gas far more potent than carbon dioxide,] through leaking pipes and other equipment.”427 Data collected from one uranium enrichment company revealed that it takes a 100 MW power plant running for 550 hours to produce the amount of enriched uranium needed to fuel a 1000 MW reactor, of the most efficient design currently available, for just one year.428 According to the Washington Post, “[t]wo of the nation’s most polluting coal plants, in Ohio and Indiana, produce electricity primarily for uranium enrichment.”429 When one takes into account the carbon-equivalent emissions associated with the entire nuclear lifecycle, nuclear plants contribute significantly to climate change and will contribute even more as stockpiles of high-grade uranium are depleted. An assessment of 103 lifecycle studies of greenhouse gas equivalent emissions for nuclear power plants found that the average CO2 emissions over the typical lifetime of a plant are around sixty-six grams for every kWh, or the equivalent of some 183 million metric tons of CO2 in 2005.430 If the global nuclear industry were taxed at a rate of $24 per ton for the carbon equivalent emissions associated with its lifecycle, the cost of nuclear power would increase by about $4.4 billion per year.431 The carbon equivalent emissions of the nuclear lifecycle will only get worse, not better, because, over time, reprocessed fuel is depleted necessitating a shift to fresh ore, and reactors must utilize lower quality ores as higher quality ones are depleted.432 The Oxford Research Group projects that because of this inevitable eventual shift to lower quality uranium ore, if the percentage of world nuclear capacity remains what it is today, by 2050 nuclear power would generate as much carbon dioxide per kWh as comparable gas-fired power stations.433 This bears repeating: at current levels of generation, by 2050 nuclear plants will be producing as much greenhouse gas as some fossil fuel plants.

## AT: Nuclear Power – Accidents

### Can’t be done on a large scale—too many accidents

**Sovacool\* & Cooper\*\* 8**

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Nuclear Nonsense: Why Nuclear power is no Answer to Climate Change and the World’s Post-Kyoto Energy Challenges,” Scholar

One survey of major energy accidents from 1907 to 2007 found that nuclear plants ranked first in economic cost among all energy accidents, accounting for 41% of all accident related property damage, or $16.6 billion in property loss, even though nuclear power plants did not even begin commercial operation until the 1950s.442 These numbers translate to more than one incident and $332 million in damages every year for the past three decades. Forty-three accidents have occurred since the Chernobyl disaster in 1986, and almost two-thirds of all nuclear accidents have occurred in the U.S., refuting the notion that severe accidents are relegated to the past or to countries without America’s modern technologies or industry oversight.443 Even the most conservative estimates find that nuclear power accidents have killed 4100 people,444 or more people than have died in commercial U.S. airline accidents since 1982.445 “[N]uclear power accidents have involved meltdowns, explosions, fires, and loss of coolant, and have occurred during both normal operation and extreme, emergency conditions such as droughts and earthquakes.”446 One index of nuclear power accidents that included costs beyond death and property damage—such as injuring and irradiating workers and malfunctions that did not result in shutdowns or leaks—documented 956 incidents from 1942 to 2007.447 Using some of the most advanced probabilistic risk assessment tools available, an interdisciplinary team at MIT identified possible reactor failures in the U.S. and predicted that the best estimate of core damage frequency was around one every 10,000 reactor years.448 In terms of the expected growth scenario for nuclear power from 2005 to 2055, the MIT team estimated that at least four serious core damage accidents will occur and concluded that “both the historical and the PRA [probabilistic risk assessment] data show an unacceptable accident frequency.”449 Further, “[t]he potential impact on the public from safety or waste management failure . . . make it impossible today to make a credible case for the immediate expanded use of nuclear power.”450 Another assessment conducted by the CEA in France tried to associate nuclear plant design with human error such that technical innovation could help eliminate the risk of human-induced accidents.451 Two types of mistakes were deemed the most egregious: errors committed during field operations, such as maintenance and testing, that can cause an accident, and human errors made during small accidents that cascade to complete failure.452 There may be no feasible way to “design around” these risks. For example, when another group of CEA researchers examined the safety performance of advanced French Pressurized Water Reactors, they concluded that human factors would contribute to about one-fourth (twenty-three percent) of the likelihood of a major accident.453

### Even one meltdown kills hundreds of thousands

**Coplan 6** – Professor of Law

Karl S., Associate Professor of Law, Pace University School of Law “The Inter-civilizational Inequities Of Nuclear Power Weighed Against The Intergenerational Inequities Of Carbon Based Energy,” 17 Fordham Envtl. Law Rev. 227, Symposium, 2006

The consequences of a severe nuclear reactor accident can be hard to predict. However, using the most recent models and making optimistic assumptions about the success of evacuation efforts and evacuation travel times, the Riverkeeper organization has estimated that a reactor meltdown at one of the Indian Point nuclear power units fifty miles north of New York City would result in as many as 44,000 short term fatalities from radiation exposure, 518,000 latent cancer fatalities, $ 2 trillion in property damage, and the relocation of eleven million people. 100 The Nuclear Regulatory Commission's 1982 report estimates the consequences of a severe reactor accident at Indian Point as 46,000 Peak Early Fatalities, 141,000 Peak Early Injuries, and 13,000 Peak Deaths from cancer, along with $ 274 billion (1982 dollars) in property damage. 101

**New Tech isn’t safe**

**Sovacool\* & Cooper\*\* 8**

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Nuclear Nonsense: Why Nuclear power is no Answer to Climate Change and the World’s Post-Kyoto Energy Challenges,” Scholar

Unfortunately, safety risks such as those at Chernobyl and Three Mile Island are only amplified with new generations of nuclear systems. Nuclear engineer David Lochbaum has noted that almost all serious nuclear accidents occurred with recent technology, making newer systems the riskiest.500 In 1959, the Sodium Research Experiment reactor in California experienced a partial meltdown fourteen months after opening.501 In 1961, the Sl-1 Reactor in Idaho was slightly more than two years old before a fatal accident killed everyone at the site.502 The Fermi Unit 1 reactor began commercial operation in August 1966, but had a partial meltdown only two months after opening.503 The St. Laurent des Eaux A1 Reactor in France started in June 1969, but an online refueling machine malfunctioned and melted 400 pounds of fuel four months later.504 The Browns Ferry Unit 1 reactor in Alabama began commercial operation in August 1974 but experienced a fire severely damaging control equipment six months later.505 Three Mile Island Unit 2 began commercial operation in December 1978 but had a partial meltdown three months after it started.506 Chernobyl Unit 4 started up in August 1984, and suffered the worst nuclear disaster in history on April 26, 1986 before the two-year anniversary of its operation.507 Safety risks may be especially acute for new reactors in the U.S. for three reasons. First, the pressure to build new generators on existing sites to avoid complex issues associated with finding new locations508 only increases the risk of catastrophe, because there is a greater chance that one accident can affect multiple reactors. Second, Generation IV researchers continue to pursue breeder reactor designs that use liquid sodium as coolant. 509 Liquid sodium, however, can be dangerous, since it can immediately catch fire when exposed to water.510 Third, the domestic nuclear industry lacks qualified and experienced staff and is losing much of the expertise that it does have to retirement, attrition and death.511 The DOE has warned that the lack of growth in the domestic nuclear industry has gradually eroded important infrastructural elements such as experienced personnel in nuclear energy operations, engineering, radiation protection, and other professional disciplines; qualified suppliers of nuclear equipment and components, including fabrication capability; and contractor, architect, and engineer organizations with personnel, skills, and experience in nuclear design, engineering, and construction.512 Since all commercial American reactors are light water reactors,513 system operators have little experience with newer gas cooled and other advanced reactor designs used throughout the world. Moreover, the Nuclear Energy Institute warned in 2005 that “half of the industry’s employees are over 47 years old, and more than a quarter . . .already are eligible to stop working,” implying that the industry had far fewer available specialists with the requisite knowledge necessary to facilitate any rapid expansion of nuclear power, let alone a safe one.514

## AT: Nuclear Power – Terrorism

### An increase in nuclear power leads to nuclear terrorism

**Sovacool\* & Cooper\*\* 8**

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Nuclear Nonsense: Why Nuclear power is no Answer to Climate Change and the World’s Post-Kyoto Energy Challenges,” Scholar

A comprehensive, three-year Department of Defense (“DOD”) study “concluded that relying on centralized nuclear plants to transmit and distribute electric power created unavoidable (and costly) vulnerabilities. The study noted that T&D systems constituted ‘brittle infrastructure’ that could be easily disrupted, curtailed, or attacked.”524 One of the authors of the DOD study, Amory Lovins, has long advanced the idea that power systems which are inefficient and centralized are, by design, prone to major failures.525 “In Britain during the coalminer strikes of 1976, a leader of the power engineers famously told Lovins that the miners brought the country to its knees in 8 weeks, we could do it in 8 minutes.”526 Centralized generation power requires an overly complex distribution system, “subject to cascading failures easily induced by severe weather, human error, sabotage, or even the interference of small animals.”527 “Continuous electrical supply,” notes Lovins, “now depends on many large and precise machines, rotating in exact synchrony across half a continent, and strung together by an easily severed network of aerial arteries whose failure is instantly disruptive.”528 The DOD’s conclusions complement a similar study undertaken by the IEA, which noted that centralized energy facilities create tempting targets for terrorists because they would need to attack only a few, poorly guarded facilities to cause large, catastrophic power outages.529 Thomas Homer-Dixon, Chair of Peace and Conflict Studies at the University of Toronto, cautions that it would take merely a few motivated people with minivans, a limited number of mortars and few dozen standard balloons to strafe substations, disrupt transmission lines and cause a “cascade of power failures across the country,” costing billions of dollars in direct and indirect damage.530 A deliberate, aggressive, well coordinated assault on the electric power grid could devastate the electricity sector and leave critical sectors of the economy without reliable sources of energy for a long time.531 Paul Gilman, former Executive Assistant to the Secretary of Energy, has argued that the time needed to replace affected infrastructure would be “on the order of Iraq, not on the order of a lineman putting things up a pole.”532 The security issues facing the modern electric utility grid are almost as serious as they are invisible. In 1975, the New World Liberation Front bombed assets of the Pacific Gas and Electric Company more than ten times, and members of the Ku Klux Klan and San Joaquin Militia have been convicted of attempting to attack electricity infrastructure.533 Internationally, organized paramilitaries such as the Farabundo-Marti National Liberation Front were able to interrupt more than ninety percent of electric service in El Salvador and penned manuals for successfully attacking power systems.534 A natural gas pipeline in Colombia has been shot so many times that operators fondly refer to it as “the flute.”535 The vulnerabilities of centralized generation systems to accidental or intentional disaster has never been so apparent as in Iraq, where determined insurgents destroy critical infrastructure faster than American contractors can rebuild it. James Robb, a former “black ops” agent and expert in counter-terrorism, warns that a terrorist-criminal symbiosis is developing out of the situation in Iraq.536 There, terrorists have learned to fight nation-states strategically, without weapons of mass destruction using a new method of “systems disruption,” a simple way of attacking electricity and natural gas networks that require centralized coordination.537 In the last three years of the U.S. occupation of Iraq, relatively simple attacks on oil and electricity networks reduced or held delivery of these services to prewar levels, with a disastrous affect on the country’s infant democracy and economy.538

**Nuclear expansion leads to increased terrorism**

**Sovacool\* & Cooper\*\* 8**

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Nuclear Nonsense: Why Nuclear power is no Answer to Climate Change and the World’s Post-Kyoto Energy Challenges,” Scholar

The Nobel Prize winning nuclear physicist Hannes Alfven has been noted as saying that “[a]toms for peace and atoms for war are Siamese twins.”551 Because slightly less than twenty pounds, or 9.07 kilograms, of plutonium is needed to make a nuclear weapon,552 every ton of separated plutonium waste has enough material for 110 nuclear weapons. The European Union alone produces 2500 tons of spent fuel produced annually, containing about twenty-five tons of separated plutonium, along with 3.5 tons of minor actinides such as neptunium, americium, and curium and three tons of long-lived fission products553—enough fissile material for 2750 new nuclear weapons every year. The four countries with the largest reprocessing fleets—Belgium, France, Germany, and UK—declared more than 190 tons of separated plutonium in 2007, mostly stored in plutonium dioxide powder at above ground sites and fuel manufacturing complexes554— enough for 20,900 nuclear weapons. Put another way, the typical nuclear reactor produces enough plutonium every two months to create a nuclear weapon.555 Taken as a whole, commercial nuclear reactors already create, every four years, an amount of plutonium equal to the entire global military stockpile.556 And the manufacturing of nuclear weapons from spent fuel is not the only risk: one kilogram of plutonium is equivalent to about twenty-two million kilowatt hours of heat energy.557 A dirty bomb laced with a kilogram of plutonium can therefore produce an explosion equal to about 20,000 tons of chemical explosive.558 There is no shortage of terrorist groups eager to acquire the nuclear waste or fissile material needed to make a crude nuclear device or a dirty bomb. The risks are not confined to the reactor-site. All stages of the nuclear fuel cycle are vulnerable, including: • Stealing or otherwise acquiring fissile material at uranium mines; • Attacking a nuclear power reactor directly; • Assaulting spent fuel storage facilities; • Infiltrating plutonium stores or processing facilities; • Intercepting nuclear materials in transit; • Creating a dirty bomb from radioactive tailings.559 After three decades of searching, Pacific Gas & Electric is still unable to locate segments of one of their fuel rods missing from its Humboldt Bay nuclear power plant.560 Since 1993, shortly after the collapse of the Soviet Union, authorities have documented 917 incidents of nuclear smuggling in Russia, Germany, France, Turkey, Libya, Jordan, and Iran, and those are only the incidents we know about.561 A 2004 Jane’s Intelligence Review report concluded that a **substantial increase** in the number of new nuclear power plants worldwide would **directly increase the risks** associated with nuclear weapons proliferation.562 Existing safeguards are clearly inadequate. After all, the International Atomic Energy Agency was unable to prevent India, Pakistan, Iran, Libya, and North Korea from using their civilian reactors to launch weapons programs.563

## AT: Biofuel – Uniqueness / Food Prices

**Biofuel development now, and plans for it in the future are minor**

**Timilsina et al. 10.**

Govinda R., Senior Economist at the World bank. John C. Beghin is a Professor of International Agricultural Economics at Iowa State University. Dominique van der Mensbrugghe is a lead economist at the World Bank and Simon Mevel is a research analyst at the World Bank. “The Impact of Biofuel Targets on Land-Use Change and Food Supply: A Global CGE Assessment” December 2010.) World Bank

Considering the size and complexity of the model, we could not exactly incorporate all policy parameters which might affect the quantitative results, particularly in the enhanced scenario. For example, the United States will not subsidize ethanol production after 2015 although several bills have been introduced to extend these subsidies. The current policy in South Africa is to discourage ethanol from corn. In our model the subsidies are provided to biofuels and are not differentiated across feedstocks. Incorporating this policy would reduce the use of corn for ethanol and therefore could lower corn production and land-use for corn. Moreover, we have not accounted for existing distortions in sugar and energy markets. For example, the removal of current subsidies to fossil fuels might provide a level playing to biofuels. Even if we were able to precisely reflect these realities, the key message of the study would not have changed. There are many other similar issues which are beyond the scope of this study but could be interesting topic for further research.

**Expansion of Biofuel increases food prices**

**Timilsina et al. 10**

Govinda R., Senior Economist at the World bank. John C. Beghin is a Professor of International Agricultural Economics at Iowa State University. Dominique van der Mensbrugghe is a lead economist at the World Bank and Simon Mevel is a research analyst at the World Bank. “The Impact of Biofuel Targets on Land-Use Change and Food Supply: A Global CGE Assessment” December 2010.) World Bank

Similarly, there are many questions relating to the long-term impacts of increased biofuels production—how does the expansion affect food availability and prices in the long run? Who would gain and lose from potentially higher commodity and food prices, especially among the heterogeneous poor depending on their net buying or selling status (Winters et al. (2004))? Will biofuel production generate income and reduce poverty despite higher food prices? What are the land supply responses? Our paper examines some of these long-term issues using a global dynamic computable general equilibrium (GDCGE) model augmented with an explicit land allocation module and detailed biofuel production sectors. The GDCGE model is developed in ways to account for the competition between biofuel and food industries for agricultural commodities. The major biofuel feedstock is composed of corn, sugarcane, soybean oil, palm oil, and other vegetable oils and their backward linkages to oilseeds. We do not include second generation or cellulosic biofuels in the study due to limitations in data and their unknown profitability. The approach pays particular attention to productivity gains through increases in yield and to changes in land allocation between various uses between forest land and agriculture and within agricultural uses. Yield assumptions have been contentious in the biofuel literature because of their implications for land expansion (Searchinger et al., 2008; and Keeney and Hertel, 2008). An **expansion of biofuels** would result in diversion of land used for other agricultural commodities towards production of biofuel feedstock. Grassland and forest land could be converted to agricultural land to produce biofuel feedstock. Yield responses to higher prices mitigate these land diversions and reallocations although the exact magnitude of these responses remains uncertain. This uncertainty is an important caveat qualifying our results. We emphasize as well that our results represent estimates of long-term impacts and do not shed light on the potential for and causes of short-term food price crises, such as the one that occurred in 2008.

### Future investments in biofuel technology will make the problem worse—intervening actors won’t solve

**Bahel\*, Marrouch\*\* and Gaudet\*\*\* 11** (Eric A.\*, Department of Economics @Virginia Tech, Walid\*\*, Business professor @Lebanese American University and CIRANO and Gerard\*\*\*, Department of economics at University of Montreal. “The Economics of Oil, Biofuel and Food Commmodities. February 6th 2011.) <http://ideas.repec.org/p/vpi/wpaper/e07-26.html>

Although the effect on the price path of food of introducing competition for land between food and biofuel productions is clear, it is not so clear whether investing in productivity enhancing measures in the agricultural food sector, as advocated by the UN secretary general during the 2008 food summit, would alleviate the effect of biofuel production on food prices. What the effect of such productivity measures might be turns out to depend in a complex manner on the various parameters involved in the competition for land between the food and biofuel sectors and in the competition on the energy market between the biofuel and fossil fuel sectors: it may or may not alleviate the pressure on food prices, as it may alleviate it in the short term but not in the long term, or vice-versa. Hence the matter remains an entirely empirical one, but an empirical one which certainly deserves further investigation **given its importance** for the so-called “food security" issue.

## AT: Biofuel – Food Prices DA

### Expansion of Biofuel increases food prices

**Timilsina et al. 10**

Govinda R., Senior Economist at the World bank. John C. Beghin is a Professor of International Agricultural Economics at Iowa State University. Dominique van der Mensbrugghe is a lead economist at the World Bank and Simon Mevel is a research analyst at the World Bank. “The Impact of Biofuel Targets on Land-Use Change and Food Supply: A Global CGE Assessment” December 2010.) World Bank

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**Increases in biofuel production cause spikes in food prices—empirically proven**

**Bahel\*, Marrouch\*\* and Gaudet\*\*\* 11** (Eric A.\*, Department of Economics @Virginia Tech, Walid\*\*, Business professor @Lebanese American University and CIRANO and Gerard\*\*\*, Department of economics at University of Montreal. “The Economics of Oil, Biofuel and Food Commmodities. February 6th 2011.) <http://ideas.repec.org/p/vpi/wpaper/e07-26.html>

The recent food crisis has become a major concern for world leaders. In June 2008, the World Food Summit organized by the United Nations that took place in Rome raised many questions about the causes of this crisis and what to do about it. Indeed, since the year 2000, major food crop prices have increased for the first time since the 1970s. The prices of corn, rice, wheat as well as other crops reached record highs. According to a recent article by the Economist magazine,1 food accounts in Botswana and South Africa for a fifth of the consumer price index; in Sri Lanka and Bangladesh it accounts for two-thirds. This might explain the violent clashes that took place in several developing countries (Haiti, Cameroon and Egypt, among others) in the wake of the sharp increase in crop prices that occurred in 2007 and 2008. Against this backdrop, a number of explanations for this crisis have been proposed. First, a line of argument attributes the increase in major crop prices to the rising world demand for food, which has not been followed by adequate investments in the agricultural sector. The proponents of this view, namely the UN secretary general, declared that global food output must increase by 50% by 2030 in order to maintain `food security'. However, such an argument suffers from a drawback. While the lack of investments in agriculture has been a long-term structural problem ever since the end of the first green revolution' of the 1960s and 70s, it is the case that the recent rise in crop prices has been sharp and dramatic. An alternative view considers that the recent development of the biofuel industry has a lot to do with the food crisis. Advocates of this view include a number of specialized NGOs and renowned international research organizations, like the International Food Policy Research Institute (IFPRI). According to the IFPRI, biofuels account for up to 30% of the increase in the price of agricultural commodities. From 1999 until the summer of 2008, both global energy demand and fossil fuels prices have been steadily rising.2 This has caused pressure for the development of biofuels as an alternative source of energy.3 This was not the case during the 1990s, when the fossil fuel price was too low to allow for the economic viability of this renewable resource. This increase in the demand for biofuels has generated a `crowding-out effect' in the agricultural sector. Many argue that scarce agricultural resources are being diverted away from food production towards the production of biofuels, which results in a reduction in global crop supplies. The fact that the prices of oil and food commodities have both tumbled during a period of time following the last quarter of 2008 also suggests that, during the current decade, both prices have become highly positively correlated. In this paper we investigate, within a reasonably tractable model, the mechanisms through which these two markets are linked and how the development of the biofuel industry has affected the correlation between energy and food prices. The model also allows us to look at the possible impacts on food and energy prices of improving land use in either food or biofuel production. As we will show, those impacts are complex and difficult to predict without some careful empirical analyses.

**Biofuel production raises food prices**

**Bahel\*, Marrouch\*\* and Gaudet\*\*\* 11** (Eric A.\*, Department of Economics @Virginia Tech, Walid\*\*, Business professor @Lebanese American University and CIRANO and Gerard\*\*\*, Department of economics at University of Montreal. “The Economics of Oil, Biofuel and Food Commmodities. February 6th 2011.) <http://ideas.repec.org/p/vpi/wpaper/e07-26.html>

The object of this paper has been the study of the effects on the food sector of the recent development of biofuels as a substitute for fossil fuel in the supply of energy. We have shown how competition for the finite land resource, which takes place between biofuel and food production, explicitly defines a relationship between the energy price and the food price. The rate of depletion of the oil stock may at first increase if population is growing, but it will eventually decrease to zero as the stock gets exhausted. The price of energy will however increase continuously while the stock of oil is being depleted, due to the decline of the remaining per capita stock of oil, and this whether population is growing or constant. If population is growing, it will keep increasing after biofuel becomes the only source of energy. As for the food price, it is also increasing. Two effects account for this growth in the price of food. Firstly, the increase in the energy price raises the opportunity cost of the use of land for food production, creating an incentive for farmers to reallocate their land in favor of biofuel production. Secondly, population growth increases the demand for food, thus pushing upwards the equilibrium price in the food market.

**Multiple statistical models prove that an increase in biofuels decreases food supply thus increasing prices**

**Timilsina et al. 10**. (Govinda R., Senior Economist at the World bank. John C. Beghin is a Professor of International Agricultural Economics at Iowa State University. Dominique van der Mensbrugghe is a lead economist at the World Bank and Simon Mevel is a research analyst at the World Bank. “The Impact of Biofuel Targets on Land-Use Change and Food Supply: A Global CGE Assessment” December 2010.) World Bank

Food supply includes direct consumption of crops, fruits and vegetables, and livestock, and processed food. The composition of the food supply changes however, since the shares of livestock products, sugar, and some grains decrease the most. This global effect does not exclude stronger localized effects when feedstock and food use directly compete locally and with costly transportation. Nevertheless regional trade within a country should help dampen these potential effects. If biofuels are produced locally, trade costs must have been reduced for all commodities and arbitrage in food markets would take place if local commodity prices rise significantly. In 2020, under the ET scenario, world food supply decreases by $14.1 billion or 0.2% from the corresponding food supply in the baseline. Under the AT scenario, the reduction in food supply is about half as large (see figure 11). Note that the percentage reduction in food supply is estimated to be negligible, particularly in a dynamic context. This is due to a large base as we include the entire food sector, including cereals, processed food and livestock. Considering only cereals, Fischer et al. (2009) show that expansion of biofuels to meet the existing targets would cause a reduction in a range of 8-29 million tons of reduction in food supply in 2020 relative to their reference case. In the reference case, they projected that the total consumption of cereals in year 2020 to be 2,775 million tons. This implies that the reduction of food supply would be 0.29% to 1.05% relative to the base case. There are several reasons for the different results. The most important among them is that Fischer et al. fixed the penetration biofuels in year 2020 at the level of 2008 in the reference case, whereas our model allows the penetration of biofuels to increase in reference case due to existing fiscal incentives.

## AT: Biofuel – Deforestation DA

### Biofuels lead to massive deforestation

**Timilsina et al. 10.** (Govinda R., Senior Economist at the World bank. John C. Beghin is a Professor of International Agricultural Economics at Iowa State University. Dominique van der Mensbrugghe is a lead economist at the World Bank and Simon Mevel is a research analyst at the World Bank. “The Impact of Biofuel Targets on Land-Use Change and Food Supply: A Global CGE Assessment” December 2010.) World Bank

Our study shows that land use allocation between forest, pasture and crops, would be significantly altered, and leads to considerable forest and pasture destruction in several countries, especially under enhanced targets. Vast expansion of biofuel does lead to global forest losses of about 26.3 million hectares in 2020 under enhanced targets. Once targets are reached, technical progress eventually would reduce the reliance on land to expand agricultural output and forest land could be regained in the longer run. Within the expanded crop land uses, we obtain large effects in several countries implementing large biofuel targets. The general tendency is to expand land devoted to feedstock crops (sugar crops, coarse grains and, low quality grains for ethanol; oilseeds for vegetable oil for biodiesel). Again, these effects are large in 2020, because they correspond with the expansion phase of the targets. In the longer run, one would expect that the land expansion would recede and productivity gains would reduce the long term use of land induced in the medium term and the short term constraint on food supply would be reduced. Sugar crops and oilseeds expand the most.

**Extinction**

**Prance ’91** (Ghillean, Former Director of the Royal Botanical Gardens, Climatic Change, “A COMMENTARY ON: TROPICAL FORESTS: PRESENT STATUS AND FUTURE OUTLOOK”, 19:33-35, Springer)

If what we read here is true, and there is no reason to think otherwise, then the future of tropical forests is poor and should be a major concern of all students of climate change. If deforestation continues at the rate predicted, it will continue to be a major contributor to the net increase of atmospheric carbon dioxide, and therefore to climate change. Alterations to the boundaries between tropical forests and savanna should be a good way of monitoring the effects of climatic change upon vegetation. Historic data from palynology (e.g., Van der Hammen, 1974; Livingstone, 1982) have shown that during the Pleistocene and Holocene, small changes in temperature and rainfall greatly altered the distribution of tropical forests and savanna and of treeline level in the Andes. Climate change could also be an added factor in the reduction and distribution of tropical forest. It is a pity that deforestation is likely to obscure the boundaries and to render the study of changes in forest/ savanna margins less useful as a monitoring device for the effect of climate change. As a biologist, I am most concerned with the genetic implications of the loss of tropical rainforest. The loss of so many species will certainly weaken the possibilities of human survival on the planet. With the loss of species, we lose the wild relatives of many species of proven economic value such as rubber, coffee, mahogany or cacau upon which the future of the crop may depend. We also lose species which have not yet been used but which certainly have economic potential as medicines, foods, fibres and other useful products. The erosion of our genetic heritage should be of as much concern as the climate change aspect of deforestation. Myers correctly stresses in several places in his paper the prime cause of deforestation, the increase in world population beyond sustainable limits As populations increase, the importance of the preservation of genetic diversity also increases because we will depend upon it more to feed the hungry and to avert epidemics of disease by discovering a diversity of new medicines. However, the increase in population and the maintenance of species diversity appear to be incompatible. It would surely be prudent to get to the root of the problem quickly and work harder on population planning.

## AT: Wind Power – Keystone Species DA

### Wind farms kill raptors and bats—biologists confirm they are keystone species

**Lilley\* and Firestone\*\* 08**. (Meredith Blaydes\*, PhD candidate in the College of Marine and Earth Studies and Jeremy\*\*, Associate professor of Marine and Earth studies @University of Delaware and Senior Research Scientist for the Center for Carbon-free Power Integration. “Wind Power, Wildlife, And the Migratory Bird Treaty Act: A Way Forward.”) <http://www.ceoe.udel.edu/cms/jfirestone/MBTA-LawPaper-MBandJF-accepted.pdf>

Avian and bat impacts of wind-energy facilities are not homogenously distributed across the United States, but instead vary by species and region.14 Studies show high levels of bird and bat kills at wind farms in California and Appalachia, respectively, while studies on wind facilities in other regions of the country reveal lower mortality levels.15 While overall the most frequent fatalities at wind farms are night-migrating passerines,16 the case is quite different at the Altamont Pass wind facility in northern California, where over 1000 raptors are killed annually.17 These avian impacts, ongoing for over twenty years,18 have generated a high level of concern among biologists, as has the more recent discovery19 of unprecedented bat kills at wind facilities in West Virginia and Pennsylvania20—for example, over 2000 at sixty-four turbines over one six-week period.21 Compared to other species, fatalities such as these probably have more damaging population effects on raptors and bats, as both are long-lived with characteristically low reproductive rates, and also due to the “relatively low abundance of raptors.”22 Further, little is currently known about bat movement, migration, and behavior,23 thus making effective avoidance and mitigation planning difficult, if not impossible. More positively, a recent National Research Council study found “no evidence of significant impacts” on avian populations in general at the present installed U.S. wind power generation level.24 Bird collisions with wind turbines were estimated to be between 20,000 and 37,000 in 2003, according to the Council.25 In another congressionally commissioned study, the Government Accountability Office (GAO) noted that if wind power expansion in the United States meets its stated goal—growing from generating less than 1% of U.S. electricity in 2004 to 5% by 2020—over 62,000 wind turbines would need to be constructed, adding to the 16,000 turbines already in existence.26 This growth could bring the estimated annual total of bird fatalities to approximately 217,000.27 According to Erickson et al., however, even if the number of domestic wind turbines expanded to one million, they would still most likely “cause no more than a few percent of all [avian] collision deaths related to human structures.”28

## AT: Wind Power – No Solvency

### The intermittency of solar and wind technology precludes solvency

**Inhaber 11**. (Herbert, PhD in Physics and Mathematics from the University of Oklahoma. “Why wind power does not deliver the expected emissions reductions.” May 5, 2011. Science Direct.

Certain renewables, such as geothermal and hydroelectricity, clearly reduce GHGs, because they are reliable and not intermittent. However, hydroelectricity production can be diminished substantially and thus become intermittent because of drought. This occurred in Venezuela, highly reliant on this source of electricity, in April 2010 [3]. Geothermal may also emit greenhouse gases, Axtmann [4] noted Geothermal steam at the world's five largest power plants contains from 0.15 to 30% noncondensable gases including CO2,…Some CO2 and sulfur emission rates rival those from fossil-fueled plants on a per megawatt-day basis. Similar effects have been noted by Bergfeld et al. [5] in Nevada. These two renewable systems store energy—in the case of geothermal, heat beneath the earth's surface, and in the case of hydroelectricity, behind a dam—which can be drawn upon to meet varying electricity load requirements. Although they are “natural”, they contain inherent storage capacity. This is not true for certain renewables, such as solar thermal, solar photovoltaic (PVs) and wind. Each of these is **highly intermittent** (the former two less so in certain desert areas), and **do not have inherent storage capabilities**. Solar thermal storage experiments were performed as early as almost four decades ago [[6]](http://www.sciencedirect.com.proxy.lib.umich.edu/science/article/pii/S1364032111000864" \l "bib0030), but they have **not proved economically feasible** to date. In the technical term, some renewable energy is generally not dispatchable, i.e., an electrical utility cannot depend on a certain power level from these sources in the next hour or minute.

**Storage of energy is not feasible—makes wind power impossible**

**Inhaber 11**. Herbert, PhD in Physics and Mathematics from the University of Oklahoma. “Why wind power does not deliver the expected emissions reductions.” May 5, 2011. Science Direct.

There are 17 pumped storage facilities described in a recent U.S. database [7]. These are the only large scale storage facilities associated with electric grids. In principle, they could store wind and other renewable energy. However, these facilities are **geographically limited**—they require two large reservoirs, one hundreds of feet above the other. It is **not clear** how many of the 17 are sufficiently close to potential wind and renewable energy sources to store some of their energy production.

## AT: Terrestrial Solar

### Perm do SBSP and GBSP solves best

**Landis 4 – PhD in Solid State Physics**

Geoffrey A., NASA Civil Service Researcher and PhD in solid-state physics from Brown University. “Reinventing the Solar Power Satellite” February 2004.) <http://www.isdc2007.org/settlement/ssp/library/2004-NASA-ReinventingTheSolarPowerSatellite.pdf>

An economic criticism of satellite solar power systems is that when the solar array price is low enough to make satellite solar power economically feasible (typically on the order of $0.50 per watt of array), it makes more economic sense to generate the power using the solar arrays on the Earth. At the array prices required, space solar power systems will compete against very cheap terrestrial solar power, not against current-technology prices. It makes sense to develop space solar power in a way so as to make it synergetic with ground-based solar power [4]. The terrestrial solar power market will ramp-up the solar array production to the levels required for space solar power anyway; why can't we find a space solar power concept that can take advantage of the ground solar power capacity that will be installed and operational long before the first satellite power station can turn on? Table 1 shows the advantages of using space solar as a "plug and play" replacement for ground solar arrays. From the point of view of a utility customer, a rectenna to receive space-solar power looks just like a ground solar array-- both of them take energy beamed from outer space (in the form of light for solar power, in the form of microwaves for the space solar power) and turn it into DC electricity. If the space solar receivers are set up in the same place as the ground solar arrays-- in the best case, if the same arrays can be used for both-- the market for the space solar power is pre-sold. SSP becomes a drop-in replacement for an existing product, with the added advantage that it works at night.

## AT: Terrestrial Solar – No Solvency

### The intermittency of solar and wind technology precludes solvency

**Inhaber 11**. (Herbert, PhD in Physics and Mathematics from the University of Oklahoma. “Why wind power does not deliver the expected emissions reductions.” May 5, 2011. Science Direct.

Certain renewables, such as geothermal and hydroelectricity, clearly reduce GHGs, because they are reliable and not intermittent. However, hydroelectricity production can be diminished substantially and thus become intermittent because of drought. This occurred in Venezuela, highly reliant on this source of electricity, in April 2010 [3]. Geothermal may also emit greenhouse gases, Axtmann [4] noted Geothermal steam at the world's five largest power plants contains from 0.15 to 30% noncondensable gases including CO2,…Some CO2 and sulfur emission rates rival those from fossil-fueled plants on a per megawatt-day basis. Similar effects have been noted by Bergfeld et al. [5] in Nevada. These two renewable systems store energy—in the case of geothermal, heat beneath the earth's surface, and in the case of hydroelectricity, behind a dam—which can be drawn upon to meet varying electricity load requirements. Although they are “natural”, they contain inherent storage capacity. This is not true for certain renewables, such as solar thermal, solar photovoltaic (PVs) and wind. Each of these is highly intermittent (the former two less so in certain desert areas), and do not have inherent storage capabilities. Solar thermal storage experiments were performed as early as almost four decades ago [[6]](http://www.sciencedirect.com.proxy.lib.umich.edu/science/article/pii/S1364032111000864#bib0030), but they have not proved economically feasible to date. In the technical term, some renewable energy is generally not dispatchable, i.e., an electrical utility cannot depend on a certain power level from these sources in the next hour or minute.

### Backup generators mean we are still dependent on fossil fuels

Inhaber 11

Herbert, PhD in Physics and Mathematics from the University of Oklahoma. “Why wind power does not deliver the expected emissions reductions.” May 5, 2011. Science Direct.

In their discussion of future renewable deployment, Baker et al. [9] note, The baseline approach assumes a need for backup electricity generation. As the percentage of electricity produced from PVs {photovoltaics] increases, backup power is required to ensure grid reliability. For this analysis, one-to-one backup is required when electricity production capacity from PVs is 20 percent of total capacity in any region. A second regime considered by Baker et al. assumes no backup, but a zero-cost storage device. Such a device is presently not available. This point is reiterated by the report Powering the Future, by the consulting firm Parsons Brinckerhoff (as mentioned in [10]). It states that: Over-reliance on wind power could scupper [British] government plans to cut carbon emissions by 2050, consultant Parsons Brinckerhoff warned this week. The firm warned that extra back-up power generation capacity would be needed to pick up shortfalls in wind generated electricity during calm weather. The most cost effective and fast response solution would be gas fired power stations, but these **generate high levels of CO2**.

## AT: Japan CP – CP is Squo

### Counterplan is the status quo – inherency proves insufficient

Binns 7-1

Corey, “SPACE-BASED SOLAR POWER,” Power Engineering, http://www.power-eng.com/news/2011/07/1448632564/space-based-solar-power.html

Meanwhile, the Japanese Aerospace Exploration Agency (JAXA) and the California-based Solaren Corporation are planning to use microwaves to transmit solar power. Whereas the high-efficiency lasers tested by Astrium have only recently become available, highly efficient microwave transmitters have been around for years. In 2008, physicists beamed 20 watts at microwave frequencies from a mountain on Maui to the island of Hawaii, a distance of 92 miles, roughly one and a half times the depth of Earth's atmosphere. JAXA has teamed up with Mitsubishi and other companies on a $21-billion, 30-year project to launch satellites, each with 2.5 square miles of solar panels, into space. The effort would generate one gigawatt of power, approximately equivalent to a nuclear plant. Solar High Study Group, an independent advocacy group, says there is room in orbit for thousands of these satellites.

## AT: Japan CP – Won’t Share / Doesn’t Solve

### Japan won’t share the energy – doesn’t solve

Globus 9 – NASA Board of Directors

Al, “Space Solar Power Via Prizes,” http://space.alglobus.net/papers/sspContest.html

While a mature SSP economy supplying terawatts of power to Earth may be economically competitive, how do we get there? The Japanese have one answer: a $21 billion program over 30 years to design and build a one gigawatt solar power satellite [Schwartz 2009]. This is roughly the necessary level of funding and time horizon for SSP development. If successful and unanswered, this project would put Japan in position to **control the energy supplies of the future.** Should no one else step up to SSP development and the project fails, then we **will not garner the benefits** of large quantities of very clean, very reliable electricity.

## AT: Japan CP – JET DA

### JET has sufficient funding now

Kyodo News, 10

(“JET alums rally to save group’s funding from chopping block,” Kyodo News, NichiBei, 8/26/10, <http://www.nichibei.org/2010/08/jet-alums-rally-to-save-group%E2%80%99s-funding-from-chopping-block/>)

NEW YORK — More than 40 former Japan Exchange and Teaching Program alumni from across the United States recently holed themselves up in a Manhattan hotel to figure out how to sell their organization’s value to the Japanese government as potential budget cuts loom large. “I think the Japan Exchange and Teaching Alumni Association of the United States delegates came to understand how important it is that we continue to demonstrate the value of JET and JETAA,” Megan Miller Yoo, the association’s president, told Kyodo News in a recent interview after the three-day meeting ended Aug. 15. As a former assistant language teacher who spent two years in Hyogo Prefecture at Akashi Shimizu High School, she stressed the importance of coming together with one voice. “We now have a unified goal and position, which enables us to send a strong and consistent message to the Japanese government and to our local communities that JET and JETAA are not only worthwhile but essential to U.S.-Japan relations.” While the group meets annually, this year’s gathering was largely focused on the recent announcement that Tokyo is reviewing its funding for the JET program itself and the JET Alumni Association, which now has 51 regional chapters in 17 countries. The JET program was launched in 1987 to improve Japanese students’ foreign language skills and to promote intercultural exchanges at all levels. So far, over 52,000 people have cycled through as either assistant language teachers, coordinators of international relations or sports exchange advisers. About half of them are American. The volunteer alumni association was then formed two years later. Currently, there are nearly 23,000 alumni who are registered with regional chapters worldwide. The Philadelphia native also stressed how the alumni organizations were invaluable in promoting the objectives of the JET program and how funding was earmarked for “extensive” activities. Given the present situation, she and other alumni are worried that possible funding cuts would curtail their programs. Beyond utilizing the alumni each year to help select new participants, organize departure seminars for newcomers and support programs for the returnees, Yoo emphasized how the benefits extend to the greater community as well. She highlighted how the 19 regional chapters in the United States play important roles in promoting outreach activities that interest Americans in Japan. For example, she said, the New York chapter sponsors the “Japanamania” program for children. With their familiarity and enthusiasm for things Japanese, former JETs who used to work in classrooms and local governmental offices often lead activities, such as dressing kids up in cotton kimonos, called “yukata.” The experience often provides inner-city youth a rare chance to step into another world. “We want to take examples such as these and other things that we are doing and demonstrate to Japan and Japanese taxpayers that we are providing value for Japan and not just for our own member activities,” she added. At the start of the annual conference, Japan’s Consul General in New York Shinichi Nishimiya met with the participants to help mobilize them. “Today, JETAA chapters not only play an essential part in the selection, orientation and return of JET participants, they are organizations composed of individuals who will be at the vanguard of the Japan-U.S. relationship for years to come,” he was quoted in a press release. Besides the JET alumni who continue working in various Japan-related fields nationwide, the alumni are quick to point to some former participants who are also making inroads in Japan. They include Anthony Bianchi, a city assembly member in Inuyama, Aichi Prefecture, and Toby Weymiller, who is currently building an environmentally sustainable cafe in Hokkaido. Japanese Ambassador to the United States Ichiro Fujisaki spoke with members for the first time on Aug. 15. Yoo described how he had encouraged them to help Japanese people better understand the contributions the JET program and alumni associations make. Participants noted his suggestions that alumni better highlight the program’s results, show its improvements and explain its value. Other ideas, including the JET Ambassador and Reverse JET programs, were floated. The JET Ambassador idea would encourage former participants to share their knowledge in local classroom settings. The Reverse JET aims to send Japanese English teachers to English speaking countries. After returning home with a better linguistic command, they would be better equipped as teachers themselves. Yoo, who now works for Swiss Reinsurance America Corp., is concerned about the likelihood that the alumni association could face funding shortages first. “We have been told that the JET program will continue in some form for the next few years but the funding for JETAA is a little more difficult to convince people of the value,’’ she said. If JETAA survives unscathed, she believes her association could prove helpful in drawing up suggestions to revamp the program. An immediate aim of the meeting is to turn over a report to the Council of Local Authorities for International Relations in Tokyothat outlines the contributions of the American alumni activities. CLAIR was formed in 1988 to support local internationalization efforts and along with other governmental agencies manages the JETprogram. In the longer term, JETAA is preparing to present a 10-point document. Modeled after a similar one tailored for the Peace Corps, a volunteer program run by the U.S. government, it would highlight the benefits of the alumni association. While some have suggested that Japan should forgo JET and hire private English teachers in its place to save money, Yoo insists that the program helps cultures build bridges at the local level. “You are not just teaching at the school, but you are really involved in the community, in the students’ lives and with the other teachers as well,’’ she said.

### JET on the chopping block – new spending tanks it – hurts US-Japan relations

Gannon 10 – Executive Director of the Japan Center for International Exchange

Jim, served as the Executive Director of the Japan Center for International Exchange, 7-2010, ““JET Program on the Chopping Block”,”

“JET Program on the Chopping Block” As part of Japan’s efforts to grapple with its massive public debt, the JET Program may be cut. Soon after coming into power, the new DPJ government launched a high profile effort to expose and cut wasteful government spending. This has featured jigyo shiwake–budget review panels that were tasked with reviewing government programs and recommending whether they should be continued or cut. (See Stacy Smith’s (Kumamoto-ken CIR, 2000-03) May 21 WITLife post that explains jigyou shiwake and touches on the threat to the JET Program.) In May 2010, the JET Program and CLAIR came up for review, and during the course of an hourlong hearing, the 11-member panel criticized the JET scheme, ruling unanimously that a comprehensive examination should be undertaken to see if it should be pared back or eliminated altogether.When the jigyo shiwake panels were launched in November 2009, the intent was to weed out bloated spending and a wide range of government programs were put under review, from government-affiliated think tanks to host nation support for US military bases. Bureaucrats involved with each program were directed to submit a brief report on program activities and testify before panels consisting of a handful of Diet members and roughly a dozen private citizens from different walks of life. The defenders of each program were given five minutes to explain why the program is worthwhile, the finance ministry then laid out the rationale for cutting it, and then the panel held a 40 minute debate before issuing a recommendation whether the program should live or die. This extraordinary spectacle made for great theater, becoming wildly popular with voters disenchanted with a lack of government transparency and critical of recurring bureaucratic scandals. In November 2009, the first round of jigyo shiwake panels dominated the newspapers’ front pages and the hearings were streamed live by various online news sites. The process even gave rise to a new set of stars, most notably Renho, a 42 year-old Taiwanese-Japanese announcer turned Diet member who relentlessly attacked the bureaucrats who appeared before the panels. Despite this initial success, a backlash eventually began to brew against the jigyo shiwake panels, with detractors labeling them as mindless populism, arguing that panel members without any special expertise were unqualified to evaluate the programs and ridiculing the attempt to pass judgment on complex, long-standing projects with such a cursory review. In one noteworthy development, a group of Japanese Nobel laureates publicly rebuked the Hatoyama Goverment for jigyo shiwake recommendations to gut government funding for basic scientific research. Renho herself met with ridicule for arguing in one budget hearing, “What’s wrong with being the world’s number two?” On May 21, a diverse set of programs including the JET Program were lumped together in one hourlong session and, during the course of the proceedings, the JET Program was criticized as being ineffective in raising the level of Japan’s English education. One of the more publicized comments called for the elimination of the Assistant Language Teacher (ALT) portion of JET. The general sense was that the JET Program was being evaluated as an educational program with the exchange component being given short shrift, since its impact is difficult to quantify and assess. (Click here for the ruling on the JET Program in Japanese in PDF format.) A few Japanese intellectual and foreign policy leaders have begun to push back against the attacks on the JET Program, noting how important it is in terms of public diplomacy and in Japan’s engagement with a range of countries. In its June meeting in Washington, D.C., the US-Japan Conference on Cultural and Educational Exchange (CULCON), a joint US-Japan “wisemen’s commission” scathingly criticized the shortsightedness of any move to cut the JET Program, issuing a statement that “CULCON strongly endorses the JET Program, especially against the background of negative assessment expressed by some panelists of the screening process.” For its part, the US State Department also seems to be taking the position that the JET Program makes valuable contributions to the **long-term underpinnings** of US-Japan relations and **cutting it will be harmful**. Meanwhile, a handful of articles have also started to appear in the Japanese press defending the JET Program, although there have been only limited contributions to the debate so far by current and former JET participants. The number of JET participants has already been cut back by almost 30 percent from the peak in 2002, but this is the most direct threat to its survival that the program has faced in its 23-year history. The pattern that has emerged with the previous round of jigyo shiwake has been that programs receiving this type of verdict will be scaled back significantly, absent any public outcry or political maneuvering by important figures.

## JET Uniqueness

**JET is being funded in the SQ**

**Straits Times, 10**

(“Japan still struggles with English; School system, society work against fluency”, Straits Times, 7/24/10, Nexis)

For many years, the Japan Exchange and Teaching (**JET) programme**, which **is funded generously by the government**, has recruited young people from English-speaking countries, including Singapore, as assistant language teachers. The snag is that not only are many of these young people fresh out of college and lacking teaching experience, but also most of them get to teach the same class of students perhaps only once every two weeks, as they have to do duty at several schools in their district. The government, however, is not perturbed that the JET programme has not shown results as far as getting more Japanese to speak English. After all, the programme's official aim 'is promoting grassroots international exchange between Japan and other nations'. In early 2000, worried that other Asian nations were overtaking Japan in learning English, a blue-ribbon panel of prime ministerial advisers suggested making English Japan's second official language.

## JET = Chopping Block

**JET will tradeoff with any new spending**

**Hosaka, 10**

(Tomoko A., “Budget cutters target JET,” Japan Times Online, 8/11/10, <http://search.japantimes.co.jp/cgi-bin/nn20100811f1.html>)

Every year for the past two decades, legions of young Americans have descended on Japan to teach English. This government-sponsored charm offensive was launched to counter anti-Japan sentiment in the United States and has since grown into one of the country's most successful displays of soft power. Still involved: Monica Yuki, Steven Horowitz and Shree Kurlekar, all Japan Exchange and Teaching Program alumni and still active in the group, pose July 21 in New York. JET is among the biggest international exchange programs in the world. AP PHOTO But faced with stagnant growth and a massive public debt, lawmakers are aggressively looking for ways to rein in spending. One target is the Japan Exchange and Teaching Program, or JET. Versions of the JET program can be found in other countries. French embassies around the world help to recruit young people to teach their languages in France for a year. The U.S. Fulbright program, run by the State Department, works in both directions: American graduates are sent abroad to study and teach, and foreigners are brought to the U.S. to do the same. But JET's origins and historical context make it unique. Having long pursued policies of isolation — with short bursts of imperialism — Japan was looking for a new way to engage with the world in 1987, at the height of its economic rise. The country's newfound wealth was viewed as a threat in the U.S., where anti-Japanese sentiment ran high. At the same time, Tokyo wanted to match its economic power with political clout. JET emerged as one high-profile solution to ease trade friction, teach foreigners about Japan and open the country to the world. Under the program, young people from English-speaking countries — mostly Americans — work in schools and communities to teach their language and foster cultural exchange. They receive an after-tax salary of about ¥3.6 million, round-trip airfare to Japan and help with living arrangements. Word about possible cuts began filtering through JET alumni networks several weeks ago, and members of the New York group mobilized quickly, starting an online signature campaign. Former JET — as the alums are known — Steven Horowitz, now living in Brooklyn, is devoting his Web sitejetwit.com to rally support. Another alumnus in Florida launched a Facebook page. Their message to Tokyo is that Japan's return on investment in the program is priceless. Japan, they say, can't afford to lose this key link to the world, especially as its global relevance wanes in the shadow of China. And the program, they argue, not only teaches the world about Japan but also teaches Japan about the world. "There has been a benefit from the program that you can't measure," said New York native Anthony Bianchi. "People used to freak out when they'd see a foreigner. Just the fact that that doesn't happen anymore is a big benefit." Bianchi's experience shows the power of the program to create cultural ties. After working as a teacher for two years in Aichi Prefecture, he landed a job with the mayor in the city of Inuyama, an old castle town in the area. He eventually adopted Japanese citizenship and ran for the assembly. Now in his second term, the 51-year-old is working to persuade Diet members that JET is worth saving. Bianchi is not alone. Of the more than 52,000 people who have taken part, many are moving into leadership at companies, government offices and nonprofits that make decisions affecting Japan, said David McConnell, an anthropology professor at The College of Wooster in Ohio and author of a book about JET. "The JET program is, simply put, **very smart foreign policy**," he said. James Gannon, executive director for the nonprofit Japan Center for International Exchange in New York, describes JET as a pillar of the U.S.-Japan relationship and the "best public diplomacy program that any country has run" in recent decades. But taxpayers are asking if the program is worth the price — and criticism of JET has become part of a larger political showdown about how much the government can afford. The organization that oversees JET, the Council of Local Authorities for International Relations, has drawn the ire of lawmakers as a destination where senior bureaucrats retire to plush jobs. The practice, known as "amakudari," or "descent from heaven," is viewed as a source of corruption and waste. Motoyuki Odachi, a member of a "jigyo shiwake" budget review panel that examined JET, said taxpayers are getting ripped off. "There's a problem with the organization itself," said Odachi, an Upper House member from the Chubu region. "This program has continued in order to maintain amakudari." JET's administrators tried to defend themselves at a public hearing in late May and submitted planned reforms, including a 15 percent slimmer budget this fiscal year. The council has allocated about ¥1 billion for the program, which includes airfare, orientation costs and counseling services. Teachers' salaries are paid by the towns and cities that hire them. Several government ministries cover other JET-related costs, including overseas recruitment. Odachi expects his panel's recommendations will become formal policy later this year. "Whether that means zero (money) or half, we don't know yet," he said. "But our opinion has been issued, so (JET) will probably shrink." Kumiko Torikai, dean of Rikkyo University's graduate school of intercultural communications and the author of several books on English education in Japan, says JET has outgrown its usefulness and needs an overhaul. "Bringing thousands of JETs to Japan is not a good investment for the country's taxpayers in this day and age of an already globalized world," Torikai said.

## JET – Key to Relations

### JET is critical for an effective US-Japan security relationship

Curtis, 2011 **–** Burgess Professor of Political Science, Columbia University

(Gerald, “Future Directions in US-Japan Relations,” Japan Center for International Exchange, February 2011, <http://www.jcie.org/researchpdfs/newshimoda/CurtisFinalE.pdf>)

**The US-Japan relationship is more than a military alliance** and **discussions about how to develop it should not focus on military issues alone**. Americans for one thing have a lot to learn from Japan about how to have its citizens to live healthier and longer lives. The First Lady Michelle Obama has undertaken a campaign to improve nutrition and reduce obesity, which is a major cause of disease and creates a costly strain on our healthcare system. American participants should look around while in Tokyo and count how many obese Japanese you see. Issues involving health, energy conservation and pollution control, mass transportation systems, and many others should be on the US-Japan agenda. There should be more bilateral discussion of economic issues and trade policy, including the desirability of opening negotiations for a US-Japan free trade agreement, corporate governance, entrepreneurship, approaches to developmental assistance, and how best to reform international economic institutions. Much greater attention needs to be paid to expanding cultural relations. Neither government is doing nearly enough in this area, nor is the private sector whose support for intellectual and cultural exchange programs is niggardly. Recently Eiichi Negishi, one of the Japanese recipients of this year’s Nobel Prize for science who has for many years taught at Purdue University, expressed alarm that the number of Japanese scientists doing research in the United States is half what it was 10 years ago. Similarly, the number of Japanese students studying at American universities has also declined precipitously over the past decade. This stands in stark contrast to students from China, Korea, Southeast Asia, India, and elsewhere whose numbers have been increasing. The popular notion that young Japanese are becoming increasing inward looking, however, is something of an exaggeration. While the number of Japanese studying in the United States has declined by nearly 50 percent over the past 10 years, that is not true for the total number of Japanese studying abroad. More Japanese are going to other English-speaking countries—especially Canada, New Zealand, and Britain—and to China and Korea to study. In 1996 just under 60,000 Japanese were studying abroad. In 12 􀀁 more recent years that number has been between 70,000 and 80,000 (though according to the OECD that number declined from 75,000 in 2007 to 67,000 in 2008). The decline in the Japanese student population in the United States, in contrast to the increase of students from other countries, is striking. Moreover, efforts to find savings in the government budget too easily result in cuts to cultural exchange programs, which do not have strong domestic lobbies to defend them. **One target has been** the Japan Exchange and Teaching **(JET)** program even though it has been successful beyond expectations. Many thousands of young Americans have participated in this program, teaching English in local high schools in Japan and working in local and prefectural governments. They have come back to the United States determined to stay connected to Japan. Rather than cutting back on this program and on the budget of the Japan Foundation and other government-funded organizations that promote cultural exchange, it would make sense for a government concerned about strengthening Japan’s intellectual and grassroots ties with the outside world to expand its cultural exchange programs, or at least not to reduce them. Compared with the cost of building a single ballistic missile, for instance, the price of such programs is quite low, but they are **an important part of a long-term security strategy**. When I was a student most Americans studying about Japan did so in graduate school and with the aim of becoming specialists on Japanese affairs. The situation today is markedly different. Few of the students in my courses on Japan at Columbia University are graduate students and few of them are planning to be Japan specialists. The great majority of students interested in Japan are undergraduates. They became aware of Japan in middle school and high school through manga, animation movies, video games, food, and fashion. Some became interested in Japan by studying Japanese in high school. Though there are still far too few high schools offering Japanese language instruction, roughly 600 do so. Once in college, many of these students want to learn more about Japan, not in order to become a Japan specialist but in a sense to become a well-rounded, educated human being. It is not true, incidentally, that Americans have lost interest in Japan and instead are mesmerized by China. There are more students at American universities studying Japanese than there are studying Chinese. According to the Modern Language Association, there were slightly fewer than 61,000 students studying Chinese in 2009 and a little more than 73,000 studying Japanese. Furthermore, at both the pre-college and college level the number of students studying Japanese has been increasing, not decreasing as so many people believe, though the rate of increase is higher for Chinese than it is for Japanese.

### JET is critical to overall US-Japan relations—it spills over into all sectors of the alliance

Dooley, 11

(Ben, “Former JETs defend program,” Kyodo News, 2/10/11, <http://search.japantimes.co.jp/cgi-bin/nn20110210f3.html>)

WASHINGTON — When current participants in the Japan Exchange and Teaching Program gather, the discussion often focuses on English teaching methods. When the program's U.S. alumni get together, however, talk often turns to a weightier subject: U.S. foreign policy toward Japan. Since the program was established in 1987, it has brought tens of thousands of young Americans to Japan for cultural exchanges with a focus on teaching English. Although the program has an uneven track record when it comes to improving Japanese students' English, it has quietly and unexpectedly become a powerful tool for achieving another objective: grooming the next generation of American leadership in U.S.-Japan relations. Michael Auslin, a former JET and prominent Japan expert at the American Enterprise Institute, said recent attacks on the program by Japanese budget screeners have focused on the quality of its English teaching while ignoring the more important element that it is one of Japan's most valuable tools for conducting "public diplomacy" both with the United States and other countries. The program's success in this regard is perhaps best demonstrated by the number of former JETs occupying Japan-related positions in both academia and in the U.S. government. The U.S. Embassy in Tokyo alone employs 25 former JETs, and JET returnees have done Japan-related work at the highest levels of the U.S. government. "The JET program created a fairly large cadre of people who had Japan experience," says Ben Dolven, a former JET and current director of the East Asia division at the Congressional Research Service, the official think tank of the U.S. Congress. "You've got a core of people who have had this experience all over, who are now part and **parcel of U.S. policymaking on Japan**," he said. Dolven's point is illustrated by an anecdote told by Michael Green, the head of Japan studies at the Center for Strategic and International Studies and former head of the Asia team in President George W. Bush's National Security Council. Green, who participated in a precursor to the JET program, was tasked with putting together a group to examine how the 2001 election of Junichiro Koizumi as prime minister might affect Japan's relations with the United States. The task force consisted of Japan experts from various government agencies, ranging from the CIA to the Treasury Department. "The interesting thing about it was that you had all of these people from all of these agencies, who had been JETs . . ." or, like Green, had participated in similar programs in Japan, he said. The group put together a set of recommendations that "became, in many ways, a blueprint for President Bush's first meeting with Koizumi," Green said. Dolven said that because JETs often work in rural areas, the program gives them a more nuanced view of the "real" Japan, a background that provides crucial context for better understanding the country and **making informed policy decisions**. "There are lives being lived all over the country, and if you are just focused on Tokyo, you miss so much," Dolven said. Auslin said the program is probably the most successful institutionalized and organized way to get young foreigners to obtain a deeper understanding of the "real" Japan. This sentiment is embodied by Andrew Ou, a former JET now working in the U.S. Embassy's political section. While in the program 10 years ago, Ou developed a relationship with Ichita Yamamoto, now a leading figure in the Liberal Democratic Party. Ou cites this connection, as well as his JET experience with Japan's local politics, as invaluable to his current work analyzing Japanese politics. "You can't put that into an equation and come out with a figure of how important it is for bilateral relations," he said. But he believes his own and others' experiences in the program "add up **to invaluable benefits for the U.S.-Japan relationship**." Recent criticism of the program comes at a time when many scholars have observed an increasing tendency in Japan toward turning "inward," contributing to what the Japan Center for International Exchange, a New York-based think tank, has called an erosion in the "the institutional base of U.S.-Japan policy dialogue and study." Ou finds criticism of the JET program especially disappointing. "I think as a group, JET alumni **have a bigger impact on bilateral policy than any other**," he said. And that is what makes it essential to "emphasize how important the JET program was and is for me and countless other diplomats," he said.

## Relations MPX – Deters China

US-Japan relations solve Chinese belligerence and major regional war

Tkacik 10

John, retired officer in the U.S. Foreign Service who served in Beijing, Guangzhou, Hong Kong and Taipei, http://www.washingtontimes.com/news/2010/oct/5/china-tests-us-japan-alliance/?page=2

The islands have strategic significance to [Japan](http://www.washingtontimes.com/topics/japan/), not just for the putative seabed oil and gas resources but also because, under international law, the Senkakus qualify as "islands" capable of "sustaining human habitation." This is important because under the U.N. Convention on the Law of the Sea - to which both [China](http://www.washingtontimes.com/topics/china/) and [Japan](http://www.washingtontimes.com/topics/japan/) are parties -an "island" brings to its owner a 200-nautical-mile exclusive economic zone and sovereign claim to the aquatic resources and seabed minerals therein. Without them, Chinese territorial waters would be about 200 miles closer to [Japan](http://www.washingtontimes.com/topics/japan/) than they are now. With China's navy getting more pushy than ever before, [Japan](http://www.washingtontimes.com/topics/japan/) has reason to keep its maritime frontiers as far removed from its major islands as possible. The [Obama administration](http://www.washingtontimes.com/topics/presidency-of-barack-obama/) also sees [China](http://www.washingtontimes.com/topics/china/)'s territorial appetites elsewhere as a strategic risk for the rest of Asia. This summer, Secretary of State Hillary Rodham Clinton reasserted America's demand that[China](http://www.washingtontimes.com/topics/china/)'s claims against Southeast Asian neighbors on the South China Sea littoral be resolved peacefully and in an international context. Beijing's claims to the entire Indian state of Arunachal Pradesh - an area of [India](http://www.washingtontimes.com/topics/india/) bigger than Taiwan that no Chinese ever have inhabited - raise the specter of armed clashes between the two Asian giants that also disturb Mrs. Clinton's sleep. America's new firmness in **support of its partners across democratic Asia** will oblige [China](http://www.washingtontimes.com/topics/china/) to **reassess its aggressiveness**. Beijing certainly will regroup to test Washington again, and soon. Let's hope President [Obama](http://www.washingtontimes.com/topics/barack-obama/) is up to the task of organizing our democratic partners in the region to balance [China](http://www.washingtontimes.com/topics/china/)'s rising power.

Chinese belligerence leads to nuclear war

Walton, PhD in IR, 7

C. Dale, Lecturer in International Relations and Strategic Studies at the University of Reading, 2007, Geopolitics and the Great Powers in the 21st Century, p. 49

Obviously, it is of vital importance to the United States that the PRC does not become the hegemon of Eastern Eurasia. As noted above, however, regardless of what Washington does, China's success in such an endeavor is not as easily attainable as pessimists might assume. The PRC appears to be on track to be a very great power indeed, but geopolitical conditions are not favorable for any Chinese effort to establish sole hegemony; a robust multipolar system should suffice to keep China in check, even with only minimal American intervention in local squabbles. The more worrisome danger is that Beijing will cooperate with a great power partner, establishing a very muscular axis. Such an entity would present a critical danger to the balance of power, thus both necessitating very active American intervention in Eastern Eurasia and creating the underlying conditions for a massive, and probably nuclear, great power war. Absent such a "super-threat," however, the demands on American leaders will be far more subtle: creating the conditions for Washington's gentle decline from playing the role of unipolar quasi-hegemon to being "merely" the greatest of the world's powers, while aiding in the creation of a healthy multipolar system that is not marked by close great power alliances.

## Relations MPX – China-Taiwan

US-Japan relations solve China-Taiwan war

Focus Taiwan 10-5

Symposium reviews relations with US, Japan, China, http://focustaiwan.tw/ShowNews/WebNews\_Detail.aspx?Type=aALL&ID=201010050025

A strong security partnership between the United States and Japan is vital for Taiwan's security and confidence, and China's growing military prowess is aimed at more than just unifying Taiwan, former Japanese and U.S. officials said Tuesday at a symposium. "A strong U.S.-Japan alliance allows Taiwan to feel secure" and Taiwan's security would be badly damaged if the U.S. could not respond in the region quickly enough due to a lack of presence in Japan, said Dan Blumenthal, a research fellow at the American Enterprise Institute who served as senior country director for China, Taiwan, Hong Kong and Mongolia under the U.S. State Department.

Solves China-Taiwan war

Okamoto 2

Yukio Okamoto, special advisor to the Japanese Prime Minister’s Task Force on Foreign Relations, WASHINGTON QUARTERLY, Spring 2002, p. 59

The U.S.-Japan alliance represents a significant hope for a peaceful resolution of the Taiwan problem. Both Japan and the United States have clearly stated that they oppose reunification by force. When China conducted provocative missile tests in the waters around Taiwan in 1996, the United States sent two aircraft carrier groups into nearby waters as a sign of its disapproval of China's belligerent act. Japan seconded the U.S. action, raising in Chinese minds the possibility that Japan might offer logistical and other support to its ally in the event of hostilities. Even though intervention is only a possibility, a strong and close tie between Japanese and U.S. security interests guarantees that the Chinese leadership cannot afford to miscalculate the consequences of an unprovoked attack on Taiwan. The alliance backs up Japan's basic stance that the two sides need to come to a negotiated solution.

## Relations MPX – Asian Wars

### US-Japan relations solve Korean wars and resource conflicts that threaten Asian instability

Funabashi 9-30

Yoichi, Asia Needs Japan to Flex Civilian Muscle, Jakarta Globe, http://www.thejakartaglobe.com/opinion/asia-needs-japan-to-flex-civilian-muscle/398937

We are witnessing a “brave, grave new world” — with the rise and fall of nations underway on a grand scale. China’s rise and India’s advance are two of the most spectacular dynamics. The power shift to the Asia Pacific, however, will be a long transition, and Asia faces three major challenges over the next decade: first, the instability of the North Korean regime in the process of leadership succession and the eventual unification of the Korean peninsula; second, maritime security in the South China Sea, the Yellow Sea and the East China Sea; and third, energy and the environment.  The United States will remain a superpower, but it will also become less stable as a “new world” emerges.  This new world will be characterized by multipolarism without multilateralism — power will be dispersed and centered in local clusters all over the world, but with a less unified front and less effective global governance.  Asia is not alone, and a fundamental question for the world is how to manage restructuring for this emerging multipolar world.  Instability on the Korean peninsula is **likely to bring the most problems** in the next three to five years. Against the backdrop of a delicate leadership succession, economic crisis and further hardship unfold for North Koreans.  If North Korea implodes, there could be far-reaching ramifications for the stability of the region.  So the vision of a unified Korea is a priority.  At the same time, Asia must devise a maritime security strategy as maritime issues are a source of much tension.  The United States has so far provided maritime stability for the Asia Pacific but is increasingly challenged by China.  India is also ambitious. Maritime issues could reach a peak within five to seven years.  The South China Sea could prove to be extremely divisive as China increasingly perceives the area as its own and denies rival claims to several chains of islands.  Some Chinese call the sea their “core interest,” provoking controversy in other Asian nations.  Of course, China is not solely responsible for the dispute in the South China Sea.  However, it is notable that at a recent Asean regional forum in Hanoi, 12 nations expressed unease about China’s activities in the South China Sea.  Mishandling of East China’s maritime security issue could be a game changer for East Asian geopolitics.  This will be the first critical test for China’s much-heralded “peaceful rise” doctrine, and the country could quickly lose the respect gained over the past 30 years.  Some Chinese vehemently criticize use of the Yellow Sea for US aircraft exercises, accusing the United States of bullying.  General Luo Yuan has warned that China would not be fearful if other countries ignored China’s “core interests,” which suggest the waters surrounding China.  More worrying, the general implied that China considers the Yellow Sea part of its “offshore area” — an absurdity as it would mean that even Incheon is part of China’s “offshore territories.”  Finally, energy and environment issues will come to a head in seven to 10 years. Energy use is rapidly rising. Every country in Asia depends on oil imports.  Desperately trying to catch up with developed economies, developing and emerging countries care little about environmental degradation and lack the safeguards to prevent it.  Almost all of Asia’s major rivers — the Yangtze, Yellow, Indus, Ganges and Mekong included — begin in the Tibetan plateau.  The melting of the Himalayan glaciers, partly responsible for the current floods, will wreak catastrophic consequences across the entire continent if it continues at the present rate.  China, India and Pakistan have the first, second and sixth largest populations in the world and all are heavily dependent on the Himalayan glaciers for their water supply and livelihoods.  Water security could become Asia’s Achilles’ heel.  Amid these new dynamics and challenges, Japan has a role as stabilizer, both in its own right, as well as within in the framework of the US-Japan alliance.  During the debacle that was the 10 short months that Prime Minister Yukio Hatoyama was in power, many Asian nations expressed concern over the deterioration of US-Japanese security ties.  This revealed how Asian countries increasingly regard the alliance as an essential part of the “common good.”  Maintaining the solid deterrence factor of the US-Japan alliance regarding North Korea is even more critical as the latter displays increasing instability.  That contribution should be appreciated throughout the region, not least by the Japanese themselves.  Japan must strength its relationship with Asia in tandem with deepening its security tie with the United States. Widening the US-Japanese alliance with a third partner — such as China, India, Korea, Australia or Indonesia — would be useful.  This would answer both the critical need to strengthen the alliance on one hand and enhance regional Asian frameworks on the other.  If the two Koreas were to unify, this would give Japan an opportunity to forge a new strategic relationship and improve stability in North East Asia.  Trilateral cooperation between the United States, ROK and Japan and between China, ROK and Japan is crucial for stability.  Six-party talks or five-party talks in the future will also be useful. A new framework to form a stable and democratic world within Korea could deliver an era of peace and security.

US-Japan relations solve Asian instability

Mochizuki 96

Michael Mochizuki, Senior Fellow, Foreign Policy Studies, Brookings, September 1996, Japan Quarterly p. 21

In the context of East Asia, how closely Japan is in step with the United States will be an important factor in the calculations of potential aggressors. Any sign that these two powers are at odds during a crisis might tempt the provocative state to escalate tensions. This will increase the possibility of miscalculation and war. In other words, the odds of a peaceful resolution of crises will be greater when the United States and Japan stand together.

US-Japan alliance is critical to prevent emerging conflict in Asia

Armitage 5

Armitage, former deputy Sec. of State, Aug. 14 2005 p l/n (Richard, The Daily Yomiuri)

It might very well be difficult to isolate the elements associated with "the ascent of China" without giving due consideration to other dynamic changes unfolding in Asia--but even if possible, it would be a mistake to do so if the ultimate objective is to produce better policy options. The ascent of China is best understood from a broader perspective on Asia as a whole. It is important to note that China's evolution is unfolding at a time of other profound changes in Asia. The region is also witnessing the reemergence of Japan. Japan is acting with increased confidence, a greater comfort in assuming new roles and missions, and is exploring the scope of what might constitute a renewed position of leadership in Asia. Throughout their very long respective histories, it has virtually always been the case that there has been clarity regarding the power relationship between China and Japan. At times China was the dominant power, and on occasion, Japan has been the stronger country. It is rare indeed that the two countries see one another, and in fact, are equal powers. In terms of economic might, military capability, and diplomatic influence, China and Japan appear poised to share a coequal power status in the near term. In addition to the reemergence of Japan, the region is also seeing subtle signs of the Asianization of India. By shear virtue of the size of its population, India has always possessed the potential to be a larger player in Asia. But it is only a recent development that India itself shifted policies to the net effect of ending its self-imposed economic isolation. With a lingering feud with its neighbor to the west, India is increasingly drawn to Asia and vice versa. Economic interaction is likely on the leading face of India to Asia. Potential competition with China for resources and influence cannot be discounted. While it may be true that the aforementioned trends lead us to more question than answers, policymakers must endeavor to set the wisest course in the face of uncertainty. The stakes may very well be high as we know from history that when emerging powers seek to be accommodated by the existing powers and the existing international system, there is a high risk of political tension and military conflict. In Asia, we are seeing the emergence of two large powers--China and India--and the reemergence of another--Japan. Policy response From a U.S. perspective, I believe our orientation to the challenges associated with China should consist of three elements. First, our approach to China should be rooted in a clear vision for Asia, and a commitment to sustaining a strong bilateral alliance with Japan. Second, the United States should continue to promote comprehensive and sophisticated engagement of China. And third, we should begin to address challenges of a global nature--particularly the energy challenge--in a direct, head-on manner during what is still an early juncture in China's transformation to country with a global power mentality. Regarding Asia, the United States should seek to sustain and strengthen bilateral alliances with Australia, Japan and South Korea--with a particular focus on the U.S.-Japan alliance. While it is true that virtually every article on U.S. policy toward Asia begins with this point, it is not a mere platitude. The United States should welcome Japan's emergence as a more proactive player in Asia, and we should grow more comfortable as an alliance in planning for future uncertainties in the security environment--China's posture in Asia very much included. On questions of Asian history we can stand back--but we should in no way posture ourselves as neutral if China provokes tension in its relationship with our treaty ally Japan. Related to our alliance, it is also essential that the United States adopt a force posture that is appropriate for 21st century challenges in Asia--the uncertainties related to China's strategic direction very much included. There are certainly other things the United States should do to bolster our standing in Asia--we should strengthen relationships in Southeast Asia, and demonstrate a genuine interest in the problems and challenges of friendly countries there. We should seek to strengthen existing multilateral organizations like the Asia-Pacific Economic Cooperation forum and the ASEAN Regional Forum. And we can even explore the creation of new multilateral security mechanisms. However, U.S. Asia policy will be significantly weaker if we do not take on the necessary and hard work of strengthening The U.S.-Japan alliance. While it is commonly observed that Japan can't go it alone, it is also true that the United States can't succeed in Asia without strong relations with the government in Tokyo.

## Relations MPX – Sino-Russian Counterbalancing

Strengthening the US-Japan alliance is critical to loosen Sino-Russian ties

Brookes 5

Brookes, Fellow at the Heritage Foundation, 8-15, Peter, “An Alarming Alliance: Sino Russian ties tightening” The Heritage Foundation, <http://www.heritage.org/Press/Commentary/ed081505a.cfm>

First, the Pentagon must make sure the forthcoming Quadrennial Defense Review balances U.S. forces to address both the unconventional terrorist threat and the big-power challenge represented by a Russia-China strategic partnership. Second, the United States must continue to strengthen its relationship with its ally Japan to ensure a balance of power in Northeast Asia — and also encourage Tokyo to improve relations with Moscow in an effort to loosen Sino-Russian ties.

Sino-Russian relations trigger renewed Russian aggression

Menges 5

Menges, Sr. Fellow at the Hudson Institute, 2K5 (Constantine, “China: The Gathering Threat” pg. 426)

Of equal concern is the possible reemergence of an authoritarian dictatorship in Russia under President Putin or a successor, whether ultranationalist or Communist. Our in-depth analysis of President Putin has included insights into his personal development, his work in the Soviet foreign intelligence service (KGB), and his actions since assuming the presidency of Russia on January 1, 2000. Putin is an intelligent, disciplined, and systematic leader, determined to assure that Russia is, in his words, a "strong state," under a "dictatorship of law" and that Russia has a major role in the world.' Putin declares his support for political democracy and movement toward a market-oriented economy, but the evidence to date suggests that Russia is gradually moving toward a more autocratic path. As Russia moved toward dictatorship, Putin would attempt to maintain a Potemkin democracy for the purpose of deceiving the major democracies, so that they would continue providing needed economic support for Russia. The ever-closer relationship between Russia and China strengthens the author itarian tendencies within Russia, thereby increasing the risk that it will become more aggressive internationally. As the Chinese government develops relations with the Putin government, the Chinese Communist Party has revived direct relations with the Communist Party in Russia and also ties between the Chinese and Russian parliaments. These multiple relationships, all coordinated from the Chinese side through its Communist Party, provide many opportunities to cultivate allies in Russia and to fan suspicion of the U.S. and of democracy. This is especially true of China's ever-expanding and mutually profitable relationships with the Russian military and its military production and research entities.

Nuclear conflict

Cohen 96

Cohen, Fellow @ Heritage, 1996 (Ariel, “The New Great Game” accessed 8-24-2K5, online: http://www.heritage.org/Research/RussiaandEurasia/BG1065.cfm)

Much is at stake in Eurasia for the U.S. and its allies. Attempts to restore its empire will doom Russia's transition to a democracy and free-market economy. The ongoing war in Chechnya alone has cost Russia $6 billion to date (equal to Russia's IMF and World Bank loans for 1995). Moreover, it has extracted a tremendous price from Russian society. The wars which would be required to restore the Russian empire would prove much more costly not just for Russia and the region, but for peace, world stability, and security. As the former Soviet arsenals are spread throughout the NIS, these conflicts may escalate to include the use of weapons of mass destruction. Scenarios including unauthorized missile launches are especially threatening. Moreover, if successful, a reconstituted Russian empire would become a major destabilizing influence both in Eurasia and throughout the world. It would endanger not only Russia's neighbors, but also the U.S. and its allies in Europe and the Middle East. And, of course, a neo-imperialist Russia could imperil the oil reserves of the Persian Gulf.15 Domination of the Caucasus would bring Russia closer to the Balkans, the Mediterranean Sea, and the Middle East. Russian imperialists, such as radical nationalist Vladimir Zhirinovsky, have resurrected the old dream of obtaining a warm port on the Indian Ocean. If Russia succeeds in establishing its domination in the south, the threat to Ukraine, Turkey, Iran, and Afganistan will increase. The independence of pro-Western Georgia and Azerbaijan already has been undermined by pressures from the Russian armed forces and covert actions by the intelligence and security services, in addition to which Russian hegemony would make Western political and economic efforts to stave off Islamic militancy more difficult. Eurasian oil resources are pivotal to economic development in the early 21st century. The supply of Middle Eastern oil would become precarious if Saudi Arabia became unstable, or if Iran or Iraq provoked another military conflict in the area. Eurasian oil is also key to the economic development of the southern NIS. Only with oil revenues can these countries sever their dependence on Moscow and develop modern market economies and free societies. Moreover, if these vast oil reserves were tapped and developed, tens of thousands of U.S. and Western jobs would be created. The U.S. should ensure free access to these reserves for the benefit of both Western and local economies.

## Relations MPX – China Relations

US-Japan relations are a pre-requisite for US-China relations

Nikkei 9-21

Japan Needed For Better U.S.-China Ties: Biden, http://e.nikkei.com/e/fr/tnks/Nni20100921D21EE831.htm

U.S. Vice President Joe Biden called Japan an indispensable partner in efforts to maintain the U.S.-China relationship and resolve the North Korean nuclear deadlock, at a conference in Washington on Monday. Biden made the remarks at the first meeting of the U.S.-Japan Council since U.S. President Barack Obama took office in January 2009. In his keynote speech, Biden said U.S. discussions on foreign policy tend to center on the country's ties with China, without understanding the importance of Japan.

## Relations MPX – Economy

US-Japan relations are key to the global economy

Tyson 2k

Laura D’Andrea Tyson, Former Economic Advisor to the Clinton Administration, 2000 Council on Foreign Relations Future Directions for U.S. Economic Policy Toward Japan

The ongoing changes within Japan's economy provide both American policymakers and businesses with opportunities to craft a new economic relationship between Japan and the United States. Task Force members agree that this relationship must rest on the premise that a healthy Japanese economy serves America's economic and geopolitical interests. Despite its decade-long stagnation, Japan remains the largest economy in Asia, America's third-largest trading partner, and its major ally in the Asia-Pacific region.

## Relations MPX – Proliferation / Laundry-List

Alliance helps solve stability, proliferation and the Middle East

Malik 5

Malik, professor, July 2 2005 p. l/n (Ahmid, The Nation)

After the end of the Cold War, the vital significance of the US-Japan security treaty as a deterrent did not diminish. Although the treaty operated during the Cold War, it largely fulfilled Japan's defence requirements.Thus the usefulness of the treaty was continuously realised and, therefore, both countries signed a security declaration on 17 April 1996 that witnessed the significant contribution made by both countries to maintain peace in the Far East, and Asia-Pacific.It is anticipated that this mutual security cooperation would continue during the 21st Century to ward off any uncertainty being generated through unresolved territorial disputes or the fear of nuclear threat in the region. Uncertainty still prevails in Northeast Asia.The situation on the Korean Peninsula remained unchanged for the last several decades in spite of the end of the Cold War.With North Korean desire to possess nuclear arms and to upgrade its missile programme, the situation seems quite away from diffusion.The concern of Japan and its vital importance as close security ally of the United States has tremendously increased.Moreover, the 9/11 incidents further strengthened the US-Japan alliance and extended cooperation not only within the Far East and Asia-Pacific region but also beyond this region such as to respond to crises in Afghanistan and Iraq.The US-Japan alliance has been rather expanded to cope with new challenges that include terrorism, **nuclear proliferation**, and **ballistic missiles** and various overtures that could affect peace and stability in the world.Therefore, Japan's future defence vision revolves around two basic principles i.e., to repeal any attack that comes to its soil in accordance to its Constitution and to help improve global environment through peaceful means.

## Relations MPX – Hegemony

US-Japan relations key to hegemony

Chaffin 10-9

Greg, An Increasingly Muscular Japan Re-Evaluates its Strategic Relationship with U.S., http://www.alternet.org/world/148448/an\_increasingly\_muscular\_japan\_re-evaluates\_its\_strategic\_relationship\_with\_u.s.

Over the last six decades, Japan has succeeded in rebuilding a shattered nation thanks in no small part to the security guarantee and preferential trade policies offered by the United States.  In return, the Japanese have given up sovereignty over U.S. military installations on Japan, while paying to maintain them. The United States has benefited from this arrangement as the bases on Japan have helped project American power into the Western Pacific.  In addition to gaining ‘an unsinkable aircraft carrier’ in the Pacific, the United States has been able to maintain a forward military presence that is significantly cheaper because of Japanese contributions to base maintenance.  Originally intended to help stem the spread of communism, and protect a strategic economic ally, the U.S. military presence in the Western Pacific has become an int**egral factor in sustaining U.S. global hegemony**, particularly as a result of the increasing importance of East Asia to the global [economy](http://books.google.com/books?id=whqvYdDz3D4C&printsec=frontcover&dq=securing+japan+richard+j+samuels&hl=en&ei=qGCZTKnkOsP58Abc8uCJAQ&sa=X&oi=book_result&ct=result&resnum=1&ved=0CC4Q6AEwAA#v=onepage&q&f=false).

## JET – Turns Soft Power

### JET sustains effective engagement with Japan—it’s key to soft power and diplomacy

Gannon 10 – Executive Director of the Japan Center for International Exchange

(Jim, served as the Executive Director of the Japan Center for International Exchange**, “**The JET Program is a 'triumph of soft power',” Asahi, <http://www.asahi.com/english/TKY201011040234.html>)

In its 23 years, the Japan Exchange and Teaching Program has brought more than 50,000 young foreigners to Japan, including over 25,000 Americans, to teach in the school system as well as to support international exchange activities. Each of us grew to know Japan through our participation in the JET Program, and this experience has changed the direction of our careers and enriched our lives. In fact, the JET Program has touched the lives of so many people who might otherwise not be exposed to Japanese society that it is regarded by many outside of Japan as the most successful public diplomacy initiative in the world over the last several decades. Therefore, we were especially dismayed to learn that it has been criticized in the last round of the budget screening process. Since it was launched at the height of Japan-bashing in the late 1980s, the JET Program has produced an extraordinary legacy. On the one hand, we would like to think that it has been beneficial for Japanese students and communities. We have heard many stories about how students' personal interactions in the classroom with JET participants have made English into a "living language" for them and helped motivate them to use English for communication rather than just as an exam topic. We get the sense that, in our globalizing world, even students who never mastered English have benefited from their interactions with JET participants from countries they may never have thought much about before. The JET Program's least recognized contribution, however, may be its most important. This is the remarkable success it has had as a public diplomacy program. By exposing thousands of young professionals to Japanese society, it has built up deep person-to-person ties between Japanese people and an entire generation of non-Japanese from around the world. In our country, the United States, the impact of this program on U.S.-Japan relations is quite extraordinary. It is no exaggeration to say that it has become an important pillar of the bilateral relationship. As they grow older, former JET participants have started to take important posts in government, business, and civil society, bringing their personal networks and a deep appreciation of the importance of strong U.S.-Japan relations to their everyday work. In the U.S. government, for example, JET participants have worked on the frontlines of U.S.-Asia relations in the White House, the State Department and other agencies. Two JET alumni even ran for the U.S. Congress--Rob Cornilles, who ran on the Republican ticket in Oregon, and Dan Seals, a Democrat from Illinois. Similarly, when one looks at the emerging generation of Japan experts in American academic circles and think tanks, it appears that the majority are graduates of the JET Program, many of whom may have otherwise taken a very different direction in their studies and careers. **This is true of the grassroots organizations that sustain U.S.-Japan relations, too**. At least 4 of the 40 Japan-America Societies in the United States are headed by former JET participants. In evaluating the contributions of the JET Program, it is important to keep in mind the role it is playing in strengthening the foundations of Japan's engagement with the rest of the world and the world's engagement with Japan. People who are immersed in Japanese communities tend to develop a lifelong connection to Japan, and we are just starting to reap the rewards of this far-sighted program. In our rapidly changing world, where it is critical for countries to project an active global presence and where a robust U.S.-Japan partnership on a wide range of issues has become even more important, the connections built by the JET Program are an invaluable asset. **The JET Program has been a triumph of soft power.** We are so grateful for the opportunity that has given us and believe that continuing the JET Program--and further strengthening it--is important for Japan and all of its friends around the world.

### JET is key to Japan’s soft power – promotes acceptance of Japanese culture

Heng, 8 – professor in the Department of Political Science, Trinity College Lecturer in the School of International Relations at St. Andrews University, and Research Fellow at the Centre for the Study of Terrorism and Political Violence,

(Yee-Kuang, “Lost in Translation? Why Japan and Great Power Rivalry remain key to the International Politics of East Asia”, Irish Studies in International Affairs, Volume 18, June 26, 2008)

How the Chinese and Japanese project their ‘soft power’ to shape the region’s perception of them could help determine the balance of power and alliance formation dynamics in the region. Indeed, while the Japanese continue to have a negative image in Korea and China for historical reasons, other parts of Asia, such as South-East Asia, despite having themselves experienced brutal Japanese occupation in the Second World War, tend to view Japan more benignly, as a generous provider of financial investment and aid. Indeed, many South-East Asian states seem to fear the rise of Chinese influence in the region more than that of Japan. Japan is seen, on the other hand, as a model of economic success to emulate, with relatively democratic political norms, dynamic creative populations, social cohesion and low crime rates. Tokyo also very deftly dealt with the Asian financial crisis in the 1990s by creating special funds within the Asian Development Bank and contributing to IMF bail-out packages; it could utilise this economic success and ‘brand’ itself as the ‘indispensable nation’ in Asia.39 **Tokyo’s cultural exchange programmes to extend its ‘soft power ’have also been immensely successful, for example the JET program.40 [40 The Japan Exchange and Teaching (JET) Programme aims to promote grass roots internationalisation by inviting young overseas graduates to assist in international exchange and foreign-language education at various levels throughout Japan**. The programme has seen significant growth: from its original 848 participants from four countries in 1987 to 5,508 participants from 44 countries in 2006. Details of the programme are available at http://www.jetprogramme.org/ e/introduction/history.html (10 July 2007).] The Foreign Ministry in Japan has set up a Public Diplomacy Department implementing a strategy aimed at citizens of other states. Furthermore, Japan has made the concept of ‘human security’ very much its own, with active disbursement of sizeable funds to deal with socially vulnerable sections of populations menaced by the downsides of globalisation. ‘Human security’ is the ‘key which comprehensively covers all the menaces that threaten the survival, daily life and dignity of individual human beings’.41 These menaces comprise medium and long-term problems like environmental degradation, sustainable development, drugs, and trans-national crime. Japanese initiatives to deal with these issues have been ‘relatively well-received by Asian neighbours…in part due to the nature of the issue of human security, which is “soft” in principle’.42 Human security has been adopted as a pillar of Japanese foreign policy and to raise Japan’s international profile, promoting ‘Japan’s standing as a responsible member of the international community’.43