# \*\*\*Carbon Pipelines Negative\*\*\*

## T

### Pipelines not TI

#### Pipelines are not transportation infrastructure – they are legally defined as energy infrastructure

US Chamber of Commerce 10

United States Chamber of Commerce, “Transportation Performance Index – Summary Report”, <http://www.uschamber.com/sites/default/files/lra/files/LRA_TPI%20_Summary_Report%20Final%20092110>.pdf

Step 1 – Definition: Transportation Infrastructure

It is important to establish a definition of transportation infrastructure in order to establish the scope of the index.

General Definition: Moving people and goods by air, water, road, and rail.

Technical Definition: The fixed facilities―roadway segments, railway tracks, public transportation terminals, harbors, and airports―flow entities―people, vehicles, container units, railroad cars―and control systems that permit people and goods to traverse geographical space in a timely, efficient manner for an intended purpose. Transportation modes include highway, public transportation, aviation, freight rail, marine, and intermodal.

Note that pipeline infrastructure is not included in this definition. For purposes of the Infrastructure Performance Index it is considered an element of energy infrastructure.

## Consumption K

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#### The affirmative’s *production-oriented* approach to environmental degradation is unethical and legitimates unending consumption patterns

Lack 11 – MA in Environmental Politics, MSc in Hydroecology, 25 years of professional work experience, as a geologist and hydrogeologist, in both public and private sectors, Fellow of the Geological Society

Martin, “What’s wrong with Clean Coal?,” http://lackofenvironment.wordpress.com/category/carbon-capture-and-storage/

The concept of Clean Coal is almost certainly an invention of the marketing departments of coal mining companies (analagous to “safe cigarettes“). In most cases, coal-burning power stations have already cleaned-up their act as much as they can (as a result of the 30-yr old UN Convention on Long-Range Transboundary Air Pollution (LRTAP) – which continues to help humanity minimise the effects of acid rain). Therefore coal cannot be made any cleaner than it already is! Similarly, the idea of Carbon Capture and Storage (CCS) is almost certainly a ruse to make the continuance of “business as usual” seem acceptable and, the truly remarkable thing is that, governments around the world seem to have been duped by it. However, in addition to this, it would be inherently dangerous because, in order to be an effective mitigation strategy, the burried CO2 must never escape (see my earlier posts ‘The tough guide to climate denial‘ and ‘Five questions for Chris Huhne‘). Why is this so hard for our politicians to grasp? Why do they continue to insist that coal-burning power stations are acceptable? When we discovered that airborne asbestos dust was dangerous, we stopped mining it. When we discovered that inhaling smoke was dangerous, most of us stopped smoking. Now that our governments know (or at least they claim they know) that CO2 emissions endanger our stable climate, why are they falling over themselves to find ways to permit the continuance of business as usual? Could it be that, as Hansen suggests, the fossil fuel lobby is just too powerful? But I digress… This week I intend to look at Coal, Gas, Oil, and the alternatives to fossil fuels, to examine our options. However, my focus today was supposed to be CCS because it is not a mitigation strategy, it is not even an attempt to tackle the cause of the problem. On the contrary, it is an attempt to treat the symptoms; and it is an abdication of our responsibility for causing the problem. The solution to littering is not to employ more litter-pickers, it is to educate people to make them better citizens who do not despoil their environment. When the early European settlers of North America began to move west in search of new lands and new opportunities, a Frontier mentality was understandable. However, to retain such an attitude today is socially unacceptable and morally irresponsible: When you live in a wilderness, it is probably safe to treat a passing river as your source of drinking water, washing room, and toilet. However, if you are unfortunate enough to live in a Mumbai slum, this will almost certainly contribute to causing your premature death. As a parent, I had to learn to discriminate between childish irresponsibility and disobedience. However, if, as a species, we go down the CCS route (and/or pursue many of the other forms of geo-engineering) as a solution, we will be crossing the line from one to the other: That is to say, now that we know (or at least the vast majority accept that we know) that burning fossil fuels is changing our global climate, to find ways to excuse our behaviour rather than modify it is no longer just irresponsible; it is morally reprehensible. It is, as Hansen has said, a gross case of intergenerational injustice.

#### Production oriented economics are *unsustainable* – only an analytical re-orientation can break the cycle of destruction

Princen 2 – Professor of Natural Resources @ U of Michigan

Thomas, Associate Professor of Natural Resources and Environmental Policy in the School of Natural Resources and Environment at the University of Michigan, where he also co-directs the Workshop on Consumption and Environment, Michael Maniates, Professor of Political Science and Environmental Science at Allegheny College, and Ken Conca, professor of Government and Politics at the University of Maryland, “Confronting Consumption,” Confronting Consumption, Chapter 2

The difficulty in conducting such a transformative research agenda, I submit, Lies in two facts. One is the reluctance or inability of social sci-entists to ground their theorizing in the biophysical, a problem I only touch on here.' A second is the fact that the economic strands of the various disciplines focus on production. Economic sociology concerns itself with issues of labor and management, economic history with the rise of industrialism, economic anthropology with subsistence provi-sioning, and political economy with the political effects of increasing trade, finance, and development. Consumption is nearly invisible. These strands of research adopt the position of the dominant social discipline— economics—and accept consumption as a black box, as simply what people do at the end point of material provisioning, as the reason for all the "real stuff" of economic activity, that is, production. The economy produces goods and goods are good so more goods must be better. There is little reason to investigate consumption, except to estimate demand functions. Consumers, after all, will only purchase what is good for them and producers, as a result, will only produce what consumers are willing to pay for. When the prevailing social concern was insufficient production, short-ages of food and shelter for a growing population, inadequate investment and risk taking, this stress on production was understandable.2 It is also understandable when natural resource abundance and unending waste-sink capacity, at home or abroad, could be safely assumed. But today, such an ecologically "empty world" cannot be reasonably assumed. Humans are stressing ecosystem services and causing irreversible declines around the world, on land and water and in the atmosphere. What's more, the contemporary economic system is stressing societies at the in-dividual, family, community, and national levels. The biophysical and social trends are unsustainable and cannot be corrected through more tinkering—that is, more environmental improvement. Under these conditions, one must ask if the exclusive focus on pro-duction might itself contribute to abuse of resources, to the neglect of serious environmental change, especially change entailing irreversibilities and the diminution of ecosystem services, and to societal stress. One must at least ask if the predilection for environmental improvement might obscure, indeed, help drive, serious environmental change and do so by promoting production, since enhanced production, however im-plicit, is the overriding normative goal of the economic strands of the social sciences. This chapter is an attempt to point in an alternative direction, what I term the consumption angle. The task is **straightforward** in the initial stages of conceptualizing: reject the production angle, adopt its polar opposite, the consumption angle, and play out its implications. The re-sult is to show how the consumption angle raises questions outside the production angle. The first step, however, is to play out the nature of the production angle and its associated "environmental improvement” approach and show how they neglect throughput and irreversibility issues. Before proceeding, however, it is worth noting that, although such initial conceptualization is, in many ways, straightforward, the more operational it becomes the trickier it gets, as will be evident in the hypo-thetical example at the end of this chapter. This trickiness, I suspect, is not due so much to the difficulties of constructing an alternative logic, one grounded in the biophysical, as it is to the hegemony of the produc-tion angle. When the idea of production as the core of economic activity is pervasive, problems in the economy (like ecosystem decline and com munity deterioration) are logically construed as indeed, production prob-lems, problems to be solved with more or better production. If more, even better, production makes only marginal improvements, if it increases risk or material throughput,3 it only postpones the day of reckoning. Contradictions mount and risks proliferate. The challenge is to push beyond the production angle, to chart an **analytic perspective** that at once eschews the production orientation and raises difficult questions about excess resource use. The Production Angle The coincidence of a production angle on economic matters and an "improvement" perspective on environmental matters is not accidental. When economic activity or, most broadly, humans' material provision-ing, is preponderantly production oriented, the only logical way to deal with problems of production—for example, pollution or deforestation— is to "produce better." If automobiles are polluting, manufacturers produce catalytic converters. If they are consuming too much gasoline, manufacturers produce more efficient engines. If traffic is congested, planners produce more roadway and traffic signals. If suburban growth exceeds population growth, "smart growth" is pursued. If flooding destroys property, engineers build better levees. If aquifers are being drawn down, agriculturalists sink deeper wells. If a fish stock is being depleted, distributors develop markets for "trash species." If slash piles left after a logging operation create visual blemishes or a fire hazard, processors make particleboard out of the slash. In all these examples, the operation is "improved," made more efficient, or the impacts are softened. But the fundamental problem is skirted or displaced in time or space. Pollutants cannot exceed absorptive capacity. Suburban growth is still growth—that is, the conversion of farmland to residential and commercial use while previously used land is left abandoned and degraded. Aquifers are still "mined" unless their extraction rate is below their regeneration rate. Aquatic systems are still disrupted, possibly irreversibly, if one species after another is fished out. And so on. What is more, the production angle pervades all sectors of modern in-dustrial society, not just the industrial. Consider the position of a major environmental NGO in the United States, the Natural Resources Defense Council, with respect to gas guzzling, private transportation trends, and the National Petroleum Reserve in Alaska: "It is time to ask what kind of energy policy this country really needs. Sport-utility vehicles (SUVs) are getting as little as 12 miles to the gallon. By making small improvements in the fuel economy of SUVs and other light trucks, we could save ten to forty times the estimated oil holdings of the entire reserve."4 The prevalence of the production angle on economic and environ¬mental issues and the inadequacy of this perspective for dealing with "full-world," ecologically constrained conditions, suggest the need for an alternative perspective. The tack taken here is to develop a perspective centered on production's apparent flip side, consumption. This perspective maintains the focus on economic issues—that is, on the appropriation of resources for human benefit. To do so, I characterize two approaches. One is to retain the prevailing production-consumption, supply-demand dichotomy where consumption is largely wrapped up in the black box of consumer sovereignty. Certainly extensive study has been carried out on consumption within microeconomics (consumer theory) and marketing, and, in recent years, growing literatures have emerged in sociology, anthropology, and social history.5 What has been missing in these lines of work, though, is explicit analysis of the exter¬nalities of consumption. How do decisions of consumers, individually and collectively, contribute to the displacement of costs in space and time? How do personal lives change as expression, identity, and status shift to purchasing and display? How does the polity change as democracy is increasingly defined as a vote in the marketplace?6 In addition to the neglect of externalities, these literatures have largely ignored the role of power, whether it be the power some actors marshal over consumers or the power, potential or realized, consumers marshal to counter exist¬ing practices. Consumption all too often is treated as a passive process, indeed, merely a natural result of "real economics," namely, production and its variants of growth, investment, trade, and innovation. The second approach to developing the consumption angle is to flip the production angle **entirely around**, to stand it on its head and construe **all economic activity as "consuming**," as using up, as degrading. This approach pushes the analytic gaze to the opposite extreme from that of the prevailing production angle where goods are good and more goods are better. As will be seen, this approach lends itself to an ecological conception of economic activity, where consideration of environmental impact is not just an add-on but is integral to the analysis. Goods may be good but cautious consuming is **better**.7

#### The impact is extinction

Ehrenfeld 5 – Professor of Ecology @ Rutgers

David, Dept. of Ecology, Evolution, and Natural Resources @ Rutgers University, “The Environmental Limits to Globalization”, *Conservation Biology* Vol. 19 No. 2, EBSCO

The known effects of globalization on the environment are numerous and highly significant. Many others are undoubtedly unknown. Given these circumstances, the first question that suggests itself is: Will globalization, as we see it now, remain a permanent state of affairs (Rees 2002; Ehrenfeld 2003a)? The principal environmental side effects of globalization—climate change, resource exhaustion (particularly cheap energy), damage to agroecosystems, and the spread of exotic species, including pathogens (plant, animal, and human)—are sufficient to make this economic system unstable and short-lived. The socioeconomic consequences of globalization are likely to do the same. In my book *The Arrogance of Humanism* (1981), I claimed that our ability to manage global systems, which depends on our being able to predict the results of the things we do, or even to understand the systems we have created, has been greatly exaggerated. Much of our alleged control is science fiction; it doesn’t work because of theoretical limits that we ignore at our peril. We live in a dream world in which reality testing is something we must never, never do, lest we awake. In 1984 Charles Perrow explored the reasons why we have trouble predicting what so many of our own created systems will do, and why they surprise us so unpleasantly while we think we are managing them. In his book Normal Accidents, which does not concern globalization, he listed the critical characteristics of some of today’s complex systems. They are highly interlinked, so a change in one part can affect many others, even those that seem quite distant. Results of some processes feed back on themselves in unexpected ways. The controls of the system often interact with each other unpredictably. We have only indirect ways of finding out what is happening inside the system. And we have an incomplete understanding of some of the system’s processes. His example of such a system is a nuclear power plant, and this, he explained, is why system-wide accidents in nuclear plants cannot be predicted or eliminated by system design. I would argue that globalization is a similar system, also subject to catastrophic accidents, many of them environmental—events that we cannot define until after they have occurred, and perhaps not even then. The comparatively few commentators who have predicted the collapse of globalization have generally given social reasons to support their arguments. These deserve some consideration here, if only because the environmental and social consequences of globalization interact so strongly with each other. In 1998, the British political economist John Gray, giving scant attention to environmental factors, nevertheless came to the conclusion that globalization is unstable and will be short-lived. He said, “There is nothing in today’s global market that buffers it against the social strains arising from highly uneven economic development within and between the world’s diverse societies.” The result, Gray states, is that “The combination of [an] unceasing stream of new technologies, unfettered market competition and weak or fractured social institutions” has weakened both sovereign states and multinational corporations in their ability to control important events. Note that Gray claims that not only nations but also multinational corporations, which are widely touted as controlling the world, are being weakened by globalization. This idea may come as a surprise, considering the growth of multinationals in the past few decades, but I believe it is true. Neither governments nor giant corporations are even remotely capable of controlling the environmental or social forces released by globalization, without first controlling globalization itself. Two of the social critics of globalization with the most dire predictions about its doom are themselves masters of the process. The late Sir James Goldsmith, billionaire financier, wrote in 1994, It must surely be a mistake to adopt an economic policy which makes you rich if you eliminate your national workforce and transfer production abroad, and which bankrupts you if you continue to employ your own people.... It is the poor in the rich countries who will subsidize the rich in the poor countries. This will have a serious impact on the social cohesion of nations. Another free-trade billionaire, George Soros, said much the same thing in 1995: “The collapse of the global marketplace would be a traumatic event with unimaginable consequences. Yet I find it easier to imagine than the continuation of the present regime.” How much more powerful these statements are if we factor in the environment! As globalization collapses, what will happen to people, biodiversity, and ecosystems? With respect to people, the gift of prophecy is not required to answer this question. What will happen depends on where you are and how you live. Many citizens of the Third World are still comparatively self-sufficient; an unknown number of these will survive the breakdown of globalization and its attendant chaos. In the developed world, there are also people with resources of self-sufficiency and a growing understanding of the nature of our social and environmental problems, which may help them bridge the years of crisis. Some species are adaptable; some are not. For the non- human residents of Earth, not all news will be bad. Who would have predicted that wild turkeys (Meleagris gallopavo), one of the wiliest and most evasive of woodland birds, extinct in New Jersey 50 years ago, would now be found in every county of this the most densely populated state, and even, occasionally, in adjacent Manhattan? Who would have predicted that black bears (Ursus americanus), also virtually extinct in the state in the mid-twentieth century, would now number in the thousands (Ehrenfeld 2001)? Of course these recoveries are unusual—rare bright spots in a darker landscape. Finally, a few ecological systems may survive in a comparatively undamaged state; most will be stressed to the breaking point, directly or indirectly, by many environmental and social factors interacting unpredictably. Lady Luck, as always, will have much to say. In his book The Collapse of Complex Societies, the archaeologist Joseph Tainter (1988) notes that collapse, which has happened to all past empires, inevitably results in human systems of lower complexity and less specialization, less centralized control, lower economic activity, less information flow, lower population levels, less trade, and less redistribution of resources. All of these changes are inimical to globalization. This less-complex, less-globalized condition is probably what human societies will be like when the dust settles. I do not think, however, that we can make such specific predictions about the ultimate state of the environment after globalization, because we have never experienced anything like this exceptionally rapid, global environmental damage before. History and science have little to tell us in this situation. The end of the current economic system and the transition to a postglobalized state is and will be accompanied by a desperate last raid on resources and a chaotic flurry of environmental destruction whose results cannot possibly be told in advance. All one can say is that the surviving species, ecosystems, and resources will be greatly impoverished compared with what we have now, and our descendants will not thank us for having adopted, however briefly, an economic system that consumed their inheritance and damaged their planet so wantonly. Environment is a true bottom line—concern for its condition must trump all purely economic growth strategies if both the developed and developing nations are to survive and prosper. Awareness of the environmental limits that globalized industrial society denies or ignores should not, however, bring us to an extreme position of environmental determinism. Those whose preoccupations with modern civilization’s very real social problems cause them to reject or minimize the environmental constraints discussed here ( Hollander 2003) are guilty of seeing only half the picture. Environmental scientists sometimes fall into the same error. It is tempting to see the salvation of civilization and environment solely in terms of technological improvements in efficiency of energy extraction and use, control of pollution, conservation of water, and regulation of environmentally harmful activities. But such needed developments will not be sufficient—or may not even occur— without corresponding social change, including an end to human population growth and the glorification of consumption, along with the elimination of economic mechanisms that increase the gap between rich and poor. The environmental and social problems inherent in globalization are completely interrelated—any attempt to treat them as separate entities is unlikely to succeed in easing the transition to a postglobalized world. Integrated change that combines environmental awareness, technological innovation, and an altered world view is the only answer to the life-threatening problems exacerbated by globalization (Ehrenfeld 2003b). If such integrated change occurs in time, it will likely happen partly by our own design and partly as an unplanned response to the constraints imposed by social unrest, disease, and the economics of scarcity. With respect to the planned component of change, we are facing, as eloquently described by Rees (2002), “the ultimate challenge to human intelligence and self-awareness, those vital qualities we humans claim as uniquely our own. Homo sapiens will either. . .become fully human or wink out ignominiously, a guttering candle in a violent storm of our own making.” If change does not come quickly, our global civilization will join Tainter’s (1988) list as the latest and most dramatic example of collapsed complex societies. Is there anything that could slow globalization quickly, before it collapses disastrously of its own environmental and social weight? It is still not too late to curtail the use of energy, reinvigorate local and regional communities while restoring a culture of concern for each other, reduce nonessential global trade and especially global finance (Daly & Cobb 1989), do more to control introductions of exotic species (including pathogens), and accelerate the growth of sustainable agriculture. Many of the needed technologies are already in place. It is true that some of the damage to our environment—species extinctions, loss of crop and domestic animal varieties, many exotic species introductions, and some climatic change— will be beyond repair. Nevertheless, the opportunity to help our society move past globalization in an orderly way, while there is time, is worth our most creative and passionate efforts. The citizens of the United States and other nations have to understand that our global economic system has placed both our environment and our society in peril, a peril as great as that posed by any war of the twentieth century. This understanding, and the actions that follow, must come not only from enlightened leadership, but also from grassroots consciousness raising. It is still possible to reclaim the planet from a self-destructive economic system that is bringing us all down together, and this can be a task that bridges the divide between conservatives and liberals. The crisis is here, now. What we have to do has become obvious. Globalization can be scaled back to manageable proportions only in the context of an altered world view that rejects materialism even as it restores a sense of communal obligation. In this way, alone, can we achieve real homeland security, not just in the United States, but also in other nations, whose fates have become so thoroughly entwined with ours within the global environment we share.

#### The alternative is to: *reject the affirmative and approach the 1ac harms from the angle of consumption*

Princen 2 – Professor of Natural Resources @ U of Michigan

Thomas, Associate Professor of Natural Resources and Environmental Policy in the School of Natural Resources and Environment at the University of Michigan, where he also co-directs the Workshop on Consumption and Environment, Michael Maniates, Professor of Political Science and Environmental Science at Allegheny College, and Ken Conca, professor of Government and Politics at the University of Maryland, “Confronting Consumption,” Confronting Consumption, Chapter 1

Given our dissatisfaction with prevailing, fragmentary approaches to consumption and its externalities, we seek an alternative perspective, a new angle on the consumption problem. We highlight here three critical themes as a provisional framework: emphasis on the social embeddedness of consumption; attention to the linkages along commodity chains of resource use that shape consumption decisions; and stress on the hidden forms of consuming embedded in all stages of economic activity. These themes stand in contrast to the ‘‘production angle’’ and its underlying assumption of an economy with ever-expanding throughput of material and energy in the human system—an assumption that exists as if ecological, psychological, and social capacity were inﬁnitely malleable and extendable. From our ‘‘consumption angle,’’ we assume just the opposite: that there are fundamental biophysical, psychological, and social limits that can be ignored or stretched or disguised only in the short term and only at increasing social, political, and economic cost. From the production angle, ever-increasing production is logical; displacement of costs onto others in time and space is normal competitive behavior. From the consumption angle, ever-increasing throughput and displacement of costs is ultimately destructive and self-defeating. In highlighting the dangers of exceeding social capacity and risking ecological overshoot, our intent is to question underlying assumptions, to stimulate thought, and to point to new forms of intervention.

### Impact Overview

#### Extinction is inevitable absent a *new* analytical economic framework that disavows consumption – agricultural decline, spread of exotic species and diseases all risk global extinction and are *external* to the affirmative.

#### Independently, glorification of consumption *devastates* the global poor – the environmental externalities of the plan spread *slow violence* – that’s Ehrenfeld

#### This impact should be preferred

Nixon 11

Rob, Rachel Carson Professor of English, University of Wisconsin-Madison, Slow Violence and the Environmentalism of the Poor, pgs. 2-3

Three primary concerns animate this book, chief among them my conviction that we urgently need to rethink-politically, imaginatively, and theoretically-what I call "slow violence." By slow violence I mean a violence that occurs gradually and out of sight, a violence of delayed destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all. Violence is customarily conceived as an event or action that is immediate in time, explosive and spectacular in space, and as erupting into instant sensational visibility. We need, I believe, to engage a different kind of violence, a violence that is neither spectacular nor instantaneous, but rather incremental and accretive, its calamitous repercussions playing out across a range of temporal scales. In so doing, we also need to engage the representational, narrative, and strategic challenges posed by the relative invisibility of slow violence. Climate change, the thawing cryosphere, toxic drift, biomagnification, deforestation, the radioactive aftermaths of wars, acidifying oceans, and a host of other slowly unfolding environmental catastrophes present formidable representational obstacles that can hinder our efforts to mobilize and act decisively. The long dyings-the staggered and staggeringly discounted casualties, both human and ecological that result from war's toxic aftermaths or climate change-are underrepresented in strategic planning as well as in human memory. Had Summers advocated invading Africa with weapons of mass destruction, his proposal would have fallen under conventional definitions of violence and been perceived as a military or even an imperial invasion. Advocating invading countries with mass forms of slow-motion toxicity, however, requires rethinking our accepted assumptions of violence to include slow violence. Such a rethinking requires that we complicate conventional assumptions about violence as a highly visible act that is newsworthy because it is event focused, time bound, and body bound. We need to account for how the temporal dispersion of slow violence affects the way we perceive and respond to a variety of social afflictions-from domestic abuse to posttraumatic stress and, in particular, environmental calamities. A major challenge is representational: how to devise arresting stories, images, and symbols adequate to the pervasive but elusive violence of delayed effects. Crucially, slow violence is often not just attritional but also exponential, operating as a major threat multiplier; it can fuel long-term, proliferating conflicts in situations where the conditions for sustaining life become increasingly but gradually degraded.

### Link – CCS

#### The plan greenwashes tons of negative environmental externalities – only decreasing consumption can solve

EJLFCC 8

Environmental Justice Leadership Forum on Climate Change, The Fallacy of Clean Coal, http://www.jtalliance.org/docs/Fallacy\_of\_Clean\_Coal.pdf

CCS is advocated as a climate change mitigation strategy because CCS plants do not emit carbon and increase greenhouse gas pollution through that source. This argument ignores the myriad of other environmental impacts associated with CCS and coal use generally. In addition, it fails to acknowledge the social impact that coal has on communities located near its extraction, processing and burning sites. These communities are still subject to the devastating impacts of coal, even when the carbon created by coal is captured and stored. In fact, the total social and environmental impacts of coal use may increase with the use of CCS. Even if CCS eventually reduces carbon emissions from coal-burning plants, the longterm impacts of a shift to CCS technology could have unanticipated and far-reaching impacts on the environment that outweigh the benefits of short-term climate change mitigation. CCS technology is inherently more resource-intensive and expensive than conventional coal use. To work most efficiently, carbon capture needs to utilize pre-combustion technology because the CO2 released from conventional coal-fired plants is very dilute. Pre-combustion gasification plants, however, consume 25 percent of the energy they produce, requiring that more coal be mined and burned to sell the same amount of energy. 25 Another 20 percent of the energy produced is typically consumed in compressing the CO2 for storage. 26 CCS also uses 90 percent more fresh water than conventional coal-fired plants. 27 As a result of these inefficiencies, it has been estimated that the adoption of CCS as a primary component of climate change mitigation— as some argue it must be 28 —would require a 33 percent increase in resource consumption and would eliminate improvements in efficiency made in the last 50 years. 29 Such an increase in coal consumption would negatively impact the communities and ecosystems where coal is mined. The environmental and human costs of coal mining and burning are numerous and well documented. 6 30 Briefly, they include the contamination of local air and water with pollutants (including mercury, NOx, SO2, and particulate matter), the violent destruction of areas containing coal through dynamiting, strip mining, and mountaintop removal, the health risks of black lung disease and mining itself, 31 and the release of methane, a greenhouse gas 20 times more powerful than CO2. All these would increase with the adoption of CCS.

#### CCS will be used as an excuse to avoid questioning our own consumption habits

Montague 8 (Peter, co-founder and director of Environmental Research Foundation (E.R.F.) in Annapolis, Maryland, “CARBON SEQUESTRATION: WHAT'S THE POINT?”, http://ehsmanager.blogspot.com/2008/12/carbon-sequestration-whats-point.html)//AMV

What's wrong with this plan? In a nutshell: 1) The plan entails as many as 100,000 separate CO2 disposal sites in the U.S. alone. This would require creation of a hazardous-waste-CO2 disposal industry as big as, or bigger than, the oil industry.[1] 2) Creating and running an enormous CO2 hazardous-waste disposal industry would roughly double the cost of fossil-fueled electricity. But this would make solar energy cost-competitive, so why not invest in renewable solar power now instead of investing in a dead-end CO2- waste disposal industry? 3) It would take decades to build this huge new CCS industry -- but we need solutions to the CO2 problem soon. Solar power plants can be built much faster than this experimental CCS plan could develop. 4) The coal industry calls coal-with-carbon-capture "clean coal." But in reality coal-with-carbon-capture emits 60 times as much CO2, per kiloWatt of electricity, compared to a wind turbine making the same electricity. 4) CCS itself would require lots of energy. For every four power plants, we would have to build a fifth power plant just to capture and store CO2. This would waste even more coal and oil. 5) **Every engineer knows that avoiding waste is far better than managing waste. So CCS is fundamentally bad design**. [For example, see the widely-endorsed Principles of Green Engineering.] 6) Instead of solving the CO2 problem that we've created, CCS would pass the problem along to our children and their children and their children's children. Basically **buried CO2 could never be allowed to leak back out. We should take responsibility for our own problems, not pass them to our children to manage**. 7) Scientists paid by the fossil fuel companies say the CO2 will never leak back out of the ground. What if they're mistaken? Then our children and grandchildren will inherit a hot, acid-ocean, ruined world. 8) Sooner or later we're going to run out of fossil fuels -- all of them -- so eventually we have to adopt solar power. **CCS just delays the inevitable** -- a huge waste of time and money.

#### CCS is an extension of clean coal’s immoral propaganda – individual rejection is key

Donald A Brown 5/27/2012 – Associate Professor of Environmental Ethics, Science, and Law at Penn State (The “Ethics Of "Clean Coal" Propaganda,” Rock Ethic Institute, <http://rockblogs.psu.edu/climate/2012/01/ethical-analysis-of-the-climate-change-disinformation-campaign-introduction-to-a-series.html>)

Some TV commercials funded through clean coal campaigns visually or verbally reference clean coal without acknowledgment that coal combustion could be considered clean only if new unproven technologies for reducing greenhouse gas emissions from coal combustion are widely deployed. Other commercials contain often vague references to clean coal technologies that could in theory reduce greenhouse gas emissions if commercial scale of these technologies is determined through future research to be environmentally benign and economically feasible. None of these commercials, however, reveal that there are serious open questions about whether geologic carbon sequestration or other unproven greenhouse gas emission reduction technologies for use with coal combustion will be proven to be environmentally acceptable and economically viable at commercial scale. The New York Times reported this month that there is new evidence that carbon capture and storage, the technology most frequently considered to be the best hope for reducing greenhouse gases from coal combustion, may not be economically viable because of cheaper and abundant amounts of natural gas. (Wald, 2012) Claiming that coal is clean because it could be clean if a new technically unproven and economically dubious technology might be adopted is like someone claiming that belladonna is not poisonous because there is a new unproven safe pill under development that sometime in the future might be economically affordable and that may be taken with belladonna to neutralize belladonna's toxic effects. Who has been behind this campaign? According to Source Watch, these campaigns were initially created by the Center for Energy and Economic Development (CEED) in 2000. CEED also created Americans for Balanced Energy Choices (ABEC), a multimillion-dollar public relations campaign aimed at emphasizing the importance and downplaying the environmental impacts of coal-fired power production. CEED was founded by Peabody Energy, Arch Coal, Southern Company, and DTE Energy (Source Watch, 2012a). ABEC's members also have included mining companies, electric utilities, and railroad companies. The CEED was merged with Americans for Balanced Energy Choices (ABEC) to form a new coal industry front group, American Coalition for Clean Coal Electricity, on April 17, 2008 (Source Watch, 2012a). In addition to funding misleading TV commercials, on May 25 Think Progress reported that the coal industry has also recently funded AstroTurf efforts, that is fake grass roots campaigns, to give the false impression at public hearings that ordinary citizens oppose proposed EPA regulations that would regulate CO2 from coal-fired power plants. (ThinkProgress, 2012). According to ThinkProgress: "Apparently unable to find real activists, the coal industry paid AstroTurfers $50 to wear pro-coal t-shirts at an Environmental Protection Agency hearing focused on the agency's first-ever carbon standards for new power plants." The creation of AstroTurf groups around carbon energy issues has been a known tactic of the climate change disinformation campaign that began in the 1990s and a tactic which is itself ethically problematic because an AstroTurf group's very purpose is to hide from the general public the real parties in interest. The practice of using AstroTurf groups is expressly prohibited by the code of ethics of the Public Relations Society of America (PRSA, 2012) This code requires that PR professionals expressly identify real sponsors of PR activities (PRSA, 2012). Because front groups and AstroTurf organizations usually are designed to hide the real parties in interest, an ethics advisory of the Public Relations Society on these practices proclaims that it is unethical for PR professionals to represent front groups and/or other deceptive or misleading descriptions of goals, tactics, sponsors, or participants. (PRSA advisory, 2012) This advisory specifically includes AstroTurf groups as an unethical front group activity covered by the ethics advisory. (PRSA advisory, 2012) Defenders of the clean coal campaign will sometimes argue that the clean coal campaign is simply an exercise of the coal industry's right to free speech. Although free speech is to be strongly protected, speech which tells untruths about very harmful behavior is morally odious. This is the moral basis for the understanding that people are not free to yell fire in a crowded theater. In fact, the clean coal campaign is more like someone in a theater shouting that there is no fire who has no factual basis for claiming that no fire exists when smoke first appears in the theater. And so, the clean coal campaigns cannot be understood as a responsible exercise of free speech but as deeply deceptive disinformation. It is deceptive for two reasons as we have seen. First, the implied claim that coal combustion is environmentally clean is not true. It is also not true that new technologies capable of sequestering CO2 from coal fired power plants will likely be in widespread operation in the near future according to a recent article in the New York Times that explained that coal combustion that relies upon carbon sequestration may not be economically viable given competition from other fuel sources and additional costs of geologic carbon sequestration (Wald, 2012) . Second, the failure to disclose who the real parties in interest are behind front groups, AstroTurf campaigns, and those who show up at public events claiming that coal is clean are tactics meant to deceive.

#### Sole focus on carbon is reductionist – papers over broader environmental harms from consumption

Moolna 12 (Adam, Fellow of the Royal Geographical Society and his interests lie in the interplay of nature, geography and humankind. He spent two years at the University of Oxford researching carbon and marine algae, then one year working on algal biofuels for the Carbon Trust at the University of Manchester. He holds a PhD in plant sciences from Manchester and an MSc in nature conservation from University College London, “Making Sense of CO2: Putting Carbon in Context”, February, 2012, EBSCOHost, accessed: 6/25/12)//AMV

Abstract Human-driven climate change resulting from carbon emissions threatens major environmental disturbance. However, the problems we face are the environmental costs of the changing climate, not the presence of CO2 molecules as such. This essay argues that **present climate action strategies dangerously fail to appreciate the environmental, socioeconomic and climate context of carbon**. Reducing action on climate to the management of carbon emissions, while favored by governments and businesses**, threatens to create a myriad of wider environmental and social problems**. **This has been exacerbated by the subsequent transformation, made possible by this carbon reductionism, of carbon into a commodity**. Consideration of context is effectively prevented, even if one tries to factor in environmental values, because tradable carbon credits depend on treating carbon in the abstract as a commodity. Contesting the decontextualization of carbon requires researchers to explain the importance of environmental context, to develop potential models for the transition to a “climate clean” global economy, and to explore the political levers for such structural change. **The ongoing campaign to tackle CO2 and climate change is well-intentioned but misses the point somewhat**. The problems we face from our changing climate are the complex and uncertain environmental costs, not the presence of CO2 molecules as such. Yet there has been such a focus on carbon that it has become removed from its environmental and social (and even climate) context. This has been favored by politicians perhaps because it replaces the irreducible complexity of global climate dynamics with a digestible concept, and by business because it allows the commodification essential to making climate tradable. Carbon reductionism, however, means that climate action threatens to create a myriad of environmental and socioeconomic problems that the dominant political discourse is failing to consider**. Moving beyond the focus on carbon depends on a workable alternative that puts carbon back in its climate and environmental context**. A research agenda towards that end must start by explaining the importance of this context and why recontextualizing carbon within a broader environmental ethic will preclude managing carbon as a commodity. We must then go on to consider potential alternative models for environmentally sustainable climate action and suggest how we might bring about such structural change. Climate Change and Environmental Values beyond Carbon The CO2 that we have put into the atmosphere by burning oil, coal and gas over the last two centuries is now indisputably accepted to have driven some level of climate change. The more we allow CO2 levels to increase, the more we allow temperatures to rise, with consequently greater knock-on effects. Changes to atmospheric circulation patterns and water vapor fluxes because of global warming will make some places drier and some places wetter. This environmental disruption is a serious threat to agriculture, population centers and the natural [End Page 1] world. Carbon capture can lock CO2 up in various forms to partially offset fossil fuel burning; but actual cuts in CO2 emissions are hard for countries to agree upon and to put into practice because they are broadly perceived as equating to cuts in economic output. Tradable carbon credits have emerged as a financial mechanism to facilitate the distribution around the global economy of the burden of meeting targets for net emission cuts agreed upon by governments. **Reduction of the complex problems of climate change to the single issue of net CO2 emissions, however, has led to a conceptual focus on abstract carbon that excludes consideration of its wider context**. This then makes possible the commodification of carbon and the development of a functional market for carbon credits that values assets simply in terms of their carbon amount, without regard for location or other associated variables. Because of this, the global carbon economy now works largely within and for itself, losing a direct connection to the environmental values that initially concerned us about carbon in the first place. Decontextualization is indeed necessary if carbon is to be traded as a commodity within a functional market, but it leads to problems by ignoring associated ecological, geological and sociopolitical considerations. This detachment of subjective commodity value from objective value and context, as discussed by Marx under the term “fetishism,”1 has been an ongoing issue in debates about capitalism since the publication of Das Kapital. For climate action and carbon credits, fetishized carbon means the projection onto carbon of symbolic or economic values that are effectively autonomous from its objective value within the climate system and environment. Commodified carbon is inherently flawed as a concept for climate action strategy because its effective operation depends on ignoring considerations, including climate itself, other than carbon. Whether carbon atoms are part of the hydrocarbon molecules in underground oil or part of the living plants in rain-forests, for example, has a huge relevance to their role in climate dynamics and other environmental issues. Mobilization of carbon atoms from fossil fuels adds to the pool of carbon active in our climate system. Cutting down rain-forests threatens ecosystem services, biodiversity, potential pharmaceuticals, and use by local populations. Considering carbon atoms in oil as equivalent to carbon atoms in trees for trading purposes ignores important considerations, including the central issue of reducing gross levels of fossil fuel use**. What we really need is to stop adding to the pool of carbon active in the climate system,** although weaning our global economy from its dependence on oil, coal and gas will be technically and economically daunting. As well as the issues of impacts on local communities, on biodiversity, and on environmental services, research into forests and climate change mitigation has highlighted the importance of context and location in assessing the impact of carbon. The atmospheric concentrations of CO2 are important for global temperature because they affect the energy balance between sunlight received [End Page 2] and heat radiated out. But there are other controls on that balance, including the Earth’s surface reflectivity. Replacing the carbon that was stored in cut-down rainforests with carbon stored in new forests on Arctic tundra might be carbon neutral, but it could reduce the reflectance of sunlight by white snows and thus lead to further warming.2 This is one example of how carbon reductionism is likely to affect climate change mitigation itself by managing carbon in the abstract and failing to consider the non-carbon aspects of the climate system. **Carbon capture strategies**, which aim to increase uptake and storage by biological systems or by engineered physical and (bio)chemical systems**, similarly need to consider more than immediate carbon atoms**. Ocean fertilization, for example, is proposed as a means to capture additional carbon by increasing the productivity of photosynthetic marine algae.3 One of the more outlandish ideas proposed is to pump CO2 down to the seafloor,4 where, because of the high pressure of the water depth, it will remain as a “lake” of liquid CO2. Even if these strategies succeed in capturing carbon, there would be inevitable disruption of ocean ecology and likely damaging effects on ecosystem stability and biological diversity. And with regard to the carbon capture effectiveness, would seafloor CO2 lakes be stable over geological timescales? Would the extra carbon fixed by fertilized marine algae simply feed extra animal life, to eventually be released again as CO2, and therefore increase carbon turnover rather than impacting on net CO2 exchange with the atmosphere? These carbon capture strategies not only have “extra carbon” side effects but also reflexively affect the wider carbon cycle itself. This provides an illustrative example of how, paradoxically, the focus on immediate carbon prevents the wider carbon issue being dealt with.5 Why the Focus on “Carbon Neutral” Misses the Point Carbon emissions from burning fossil oil could be offset in a carbon credit sense by planting trees to lock up carbon as wood. But this is not sustainable in socioeconomic or environmental contexts because trees need to be planted somewhere—reforestation would compete with agriculture by consuming farmland, whilst afforestation would impinge on other biomes. More fundamentally, such offsetting is not sustainable in dealing with the longer-term carbon issue because it continues to allow fossil carbon to be mobilized from geological reservoirs. Measures to reduce CO2 emissions or to capture and store carbon must therefore be judged not just on their immediate net CO2 exchange with the atmosphere, but also on whether they do damage to other environmental considerations, including longer term effects on carbon cycling. That is because our ultimate interest in combating climate change is to promote a positive future for humanity on a healthy planet. Tackling the human-driven increase in [End Page 3] atmospheric CO2 is just one part of a strong and meaningful notion of sustainability, whereby our civilization lives without damaging the environment and its continuing ability to support us and the rest of nature. In making decisions about the relative importance of CO2, the environment and socioeconomic development, we must recognize that making the term “climate change” synonymous with “human influence on climate” is itself unhelpful, in that it implies the existence of an opposite “constant climate” as being the normal state of affairs. Climate and atmospheric CO2 levels, however, have been in a constant state of change throughout the Earth’s existence.6 We should also remember that CO2 levels are not the only determinants of climate; and various natural factors would continue to change both climate and levels of CO2 even if we were to achieve a carbon neutral economy. In historical times, for example, the “Little Ice Age” (1500–1900 AD) saw sustained cold temperatures, unconnected to CO2, across wide parts of the world. The cause is variously proposed to have been low solar activity and heightened volcanism,7 or disruption of North Atlantic thermohaline circulation8 (ocean-scale flows driven by differences in seawater temperature and salinity). Carbon therefore also needs to be recontextualized within the geological history of our ever-changing climate. We must not lose sight of what we are trying to protect: the Earth and our environment, not an arbitrary atmospheric CO2 level that is a snapshot of an atypical point in the planet’s history. Contesting the Decontextualization of Carbon As we have seen, valuing assets simply in terms of their carbon content dangerously ignores the other environmental and socioeconomic impacts of carbon burning and carbon capture. But the fetishization of carbon reflects the powerful convergent interests of governments and business—and to that extent these interests are winning out over the interests of the environment and the global poor. The science of climate change is complicated and the idea that becoming a carbon neutral civilization will solve all our problems is seductive**. This simplification is easier for politicians and publics to understand than the complex reality; and it promises hope by making the solution appear a straightforward matter of addition and subtraction**. **Corporations win by polishing their environmental image with carbon**. It is a lot easier to buy offsets and brand your business as “carbon neutral” than to ensure that business-wide processes are truly environmentally sustainable, in the sense that their indefinite continuation is not damaging to the environment over the short- or long-term. And, for those businesses and consultancies supplying, promoting and selling “the carbon economy,” commodified carbon equals profits. [End Page 4] Critics argue that tradable carbon credits divert climate action from the developed world to the developing, meaning that the environmental and socioeconomic costs are being met at the disproportionate expense of the poor.9 And there are social goods that one cannot put a price on, such as the existence of the Maldives and other low-lying states threatened by sea level rise. Market function and environmental consideration have conflicting requirements of carbon as a concept. Restricting the carbon accounting focus was a central precondition for the appearance of a workable carbon market, the liquidity and functioning of which depends on commodification (and hence decontextualization). **Environmental consideration,** conversely**, requires contextualization of carbon**. The paradox of carbon credits is that the commodification essential for the market prevents anything beyond carbon atoms (even climate effects) from being taken into account. Even then, economic evidence suggests that the ability of markets to reliably value environmental goods, such as existing water quality credits and wetland credits in the USA,10 is questionable. The multi-dimensional considerations of environmental “commodities” are generally beyond the comprehensive understanding of environmental scientists, let alone economists. The debates necessary to contest decontextualized carbon depend on an open discussion of the theories behind climate action and climate science. Changes to the climate driven by human releases of CO2 are fact; but that certainly does not make all action taken to cut carbon emissions correct. Ironically, the weak support for discussion within the climate change movement stymies efforts at changing our assumptions as criticisms of aspects of climate action or of climate science are too often misconstrued as attacks on the truth of global warming in general. An example of this was the climate science community’s reaction to the 2009 media stories over deleted emails involving scientists based at the University of East Anglia in England.11 The perhaps over-zealous protection of data and work practices from outside scrutiny may have been unfortunate; but the real damage was done by the apparent indignation of the wider climate science community at its work being questioned.12 Discussion and criticism are crucial to building both consensus and sound theories for climate action strategies, so science must be explained and conclusions justified. Moving towards Recontextualized Carbon To avoid carbon reduction strategies creating other major environmental problems, we need to have climate action coordinated within a wider ethic of sustainable environmental governance. In the first instance, we need to avoid fetishizing carbon in climate discussions and build awareness that “carbon” does not equal “climate” and that “carbon neutral” does not equal “environmentally [End Page 5] sustainable.” How might we link carbon back to the environment? Essays like this one that try to get people to think twice about what our CO2-related actions really mean for the future environment and for future humanity will help. We could consider the words we use in climate discussions and the meanings they engender; and, when appropriate, begin to use terms such as “climate clean” and “climate impact” instead of “carbon neutral” and “carbon footprint.” Of course, “climate clean” is a less definite term than the mathematical expression of being “carbon neutral” (carbon captured equal to carbon emitted); but, as this essay has argued, **the simplification of carbon reductionism can be dangerously misleading**. A workable model for turning sustainability into a non-commodified parameter valued by society, even if it cannot necessarily be quantified in direct monetary terms, might be something like that used for the accreditation of organic agriculture or Fair Trade goods. Products certified as being produced in accordance with certain specified standards allow consumers to consciously select, respectively, an environmentally friendly or socially just product. Accreditation of low carbon (and environmentally sustainable) systems under an analogous “climate clean” guise could, in a similar way, allow consumer choice to drive the transformation towards a climate-friendly global economy. Governments could initiate or assist such a scheme through regulatory requirements. Building up towards a comprehensive “climate clean” framework may be best envisaged as a series of negotiated steps that tackle one aspect at a time. The successful government-agreed regulatory elimination of CFCs and other ozone depleting substances from the global economy under the Montreal Protocol,13 although of interest to business actors in a way not directly comparable to the carbon issue,14 could be considered an early step already taken towards such a framework. Political leverage to bring about such a framework could be brought through economic analysis of the competitive advantages that will accrue to countries that pioneer inter-governmental agreements and business schemes towards developing “climate clean” technologies. Governments of the developed world, best positioned to drive forward global agreements through their geopolitical muscle, also have the knowledge economies best positioned to profit from pioneering “climate clean” technologies and exporting them to the global market. Compromising on economic competitiveness has probably been the main stumbling block for inter-governmental agreements on cutting carbon emissions. Research exploring the possibilities for “climate clean” economic growth and job creation helps overcome that political obstacle. Action to combat climate change will of course also advance a number of other political priorities, including global political stability, food security, and improving the lives and prospects of those in the developing world. The reason that rising carbon dioxide levels are important is that climate [End Page 6] change is a serious disturbance to our environment and is causing serious problems for our society. It is in order to deal effectively with those problems that our conceptual framework must consider carbon in context.

### Link – Energy Production

#### The affirmative’s production-centered approach ensures continued environmental destruction

Jackson 5 – Professor of Environmental Strategy @ Surrey

Tom, “Live Better by Consuming Less?,” Journal of Industrial Ecology, Volume 9, Number 1–2, Scholar

Over the past decade or so, industrial ecology has successfully focused attention on improving the resource efﬁciency of the systems of production. Reusing, remanufacturing, and recycling end-of-life products, using the wastes of one production process as inputs to another, and redesigning products, processes, and supply chains for improved efﬁciency all offer clear environmental beneﬁts to industrial society (Geyer and Jackson 2004; Graedel and Allenby 1995; Guide and van Wassenhove 2004; Jackson 1996). Over the same decade, it has become increasingly clear that such interventions will not, by themselves, deliver sustainable development. It is not enough for us to devise ever more efﬁ cient industrial processes. It is not enough to engineer cleaner and more clever technologies. It is not enough that we design greener and more ethical products. All of these things are clearly important. But none of them will ensure that consumers choose to buy the greener products or that the scale of material throughput remains within ecological limits. Purely technological approaches fall short of addressing the crucial dimension of human choice in implementing sustainable technologies and in changing unsustainable consumption patterns (Jackson and Clift 1998; Princen et al. 2002; Rayner and Malone 1998). Partly in recognition of this fact, attention has turned increasingly to questions of consumption (Jacobs and Røpke 1999; Princen et al. 2002; Reisch and Røpke 2004). The scale and pattern of consumption, the drivers of consumer expectations and behaviors; the nature of consumer decision-making processes, and the importance of shifting consumer attitudes, behaviors, and expectations in favor of cleaner products and reduced environmental impacts: all of these factors turn out to be vital in achieving sustainable development. Reﬂecting this emerging interest, the term sustainable consumption now features as an organizing principle in a wide variety of research agendas and policy initiatives (Cohen and Murphy 2001; DEFRA 2003; Heap and Kent 2000; OECD 1998; UNEP 2001). As yet no clear agreement has been reached on what sustainable consumption actually means. Some approaches focus on the role of technological innovation and “getting the prices right” and emphasize “consuming differently” rather than “consuming less” (UNDP 1998). Others imply a far more radical critique in which sustainable consumption is about “the management of greed” (Slesser 1997; Trainer 1996) in af ﬂuent societies. Neither of these positions is unequivocally useful: the ﬁrst because it offers little new to existing policy agendas; the second because it underestimates the complexity of human motivations and risks alienating those whose behavior it seeks to change. Nonetheless, the new agenda demands that we resolve at least some of the critical questions relating to consumption. In particular, we ﬁnd ourselves confronted by the very real need to ensure that environmental gains achieved through sustainable production are not offset by rebound effects, that entrenched behaviors do not render sustainable technologies redundant, and that the continued expansion of consumer expectation and demand does not simply swamp the ef ﬁciency gains made through industrial ecology. In short, we are drawn toward the need for a clearer understanding of consumer behavior and human choice. Why do we consume? What do we expect to gain from material goods? How successful are we in meeting those expectations? What constrains our choices? And what drives our expectations in the ﬁrst place? All these questions become vitally important in the search for an understanding of consumer behavior to inform sustainable development.

#### Maximizing production is the wrong starting point

Jackson 5 – Professor of Environmental Strategy @ Surrey

Tom, “Live Better by Consuming Less?,” Journal of Industrial Ecology, Volume 9, Number 1–2, Scholar

Industrial ecology has mainly been concerned with improving the efﬁciency of production systems. But addressing consumption is also vital in reducing the impact of society on its environment. The concept of sustainable consumption is a response to this. But the debates about sustainable consumption can only really be understood in the context of much wider and deeper debates about consumption and about consumer behavior itself. This article explores some of these wider debates. In particular, it draws attention to a fundamental disagreement that runs through the literature on consumption and haunts the debate on sustainable consumption: the question of whether, or to what extent, consumption can be taken as ‘‘good for us.’’ Some approaches assume that increasing consumption is more or less synonymous with improved well-being: the more we consume the better off we are. Others argue, just as vehemently, that the scale of consumption in modern society is both environmentally and psychologically damaging, and that we could reduce consumption signiﬁcantly without threatening the quality of our lives. This second viewpoint suggests that a kind of ‘‘double dividend’’ is inherent in sustainable consumption: the ability to live better by consuming less and reduce our impact on the environment in the process. In the ﬁnal analysis, this article argues, such ‘‘win-win’’ solutions may exist but will require a concerted societal effort to realize.

#### New energy production invigorates rampant consumption – radical changes in demand are necessary

Facey 8

Marlon, “Space Solar Power Demo: WWWWW & H?,” Comments Section, http://spacesolarpower.wordpress.com/2008/01/12/space-solar-power-demo-wwwww-h/

My following statements may not be what every on this website will want to hear. The problem is not lack of supply of energy; the problem is that we are demanding to much. The engineering problems at hand are to make all aspects of energy consumption more and more efficient. The Energy than is being use should come from environmentally safe and also be sustainable. The fact that we are always seeking a magic bullet (earth/space based fusion power) will not have the short/medium and long term impacts that will reduce global warming. NOTE: Earth base fusion power has to over come fundamental scientific hurdles, whilst SBSP has huge commercial, and governmental hurdles. The effects of global warming are already being felt all over the world. It is time for the human race to step up to the plate. If the solutions are to be provided by science, industry, government and commerce your attention needs to be focused on demand management and energy efficient **consumption**. The consumer is at the heart of all this since it is our way of life that has to be re-moulded. There are profits (an political capital) to be made by issuing in the creation off green technologies and economies (a second industrial revolution if you like).

### Link – Silver-Bullet

#### The affirmative locks-in production-centered approaches – prevents questioning of fundamental assumptions – tanks the permutation

Giampietro and Mayumi 9 – \*Professor of Environmental Science, \*\*Professor of Arts and Sciences

Mario Giampietro and Kozo Mayumi, “The Biofuel Delusion,” Google Book

When dealing with human systems, institutional and financial mode-locking are the most persistent and important causes of failure to adapt. But depend- ing on the circumstances, these lock-ins can be broken easily. As a matter of fact, when humans are forced to acknowledge that their behaviour must dramatically change, then their ability to adapt to existing external constraints is simply amazing. We call this ability to make sudden and dramatic changes ‘the Robinson Crusoe effect’. Everybody experiences dramatic changes in life. For example, during a steady-state period, daily life may be experienced as being totally constrained by a particular combination of work and social and family commit- ments. Then, one can be suddenly hit by a perturbation large enough to generate a collapse in the set of lock-ins determining this steady state: falling in love, getting divorced, losing a job, becoming physically impaired, or – in the case of the eponymous character – becoming shipwrecked on a remote island. When faced with a life-altering experience, the remarkable ability that humans have to adapt becomes evident. After a transitional period, necessary to tune internal characteristics to external boundary conditions, the human system (be it an individual, a small group or a country) will find new steady-state solutions made up of new routines, and new patterns that would have been totally unthinkable before the perturbation took place. A good example is daily life during times of war. This almost magical ability to adapt to novelties, an incredible flexibility in dealing with disturbance, is probably what was missing in the analysis provided by the prophets of doom in the 1970s. We need to accept without emotional stress that our current civilization will ‘collapse’ in the near future; the word ‘collapse’, in this context, means that the existing human civilization will become something else, something we are unable to imagine right now. But the substantial change associated with the term ‘collapse’ should not necessarily be equated with a major and negative cataclysm for humankind. On the contrary, a dramatic change in the existing situation can also be perceived as an oppor- tunity to make a series of positive changes. Indeed, a necessity for change should be considered as an opportunity to discuss what we would like to do in a different way. The current predicament of humankind, confronting the issue of energy and sustainability, probably represents a critical situation capable of generating the Robinson Crusoe effect. When discussing how to deal with the issue of sustainability, humans can discuss and reflect on the meaning of their develop- ment. Indeed, the virtually unlimited human capability to adapt to changes is not about fixing the planet with silver bullets; it refers to the ability to adjust ourselves to new situations, to question assumptions about technical progress, and to remove the lock-ins hampering our ability to cope with change. In this type of discussion, scientific, political, ethical and socio-economic analyses should be combined in a way that has never been done before in the history of humankind. But this does not mean that this integrated discussion is an impos- sible task. In the last century, humankind has proved capable of accomplishing a lot of ‘unthinkable’ things.

### Epistemology

#### Epistemology DA – their conclusion of “more energy production” is based on economic research that *excludes* consumption-oriented approaches

Princen 2 – Professor of Natural Resources @ U of Michigan

Thomas, Associate Professor of Natural Resources and Environmental Policy in the School of Natural Resources and Environment at the University of Michigan, where he also co-directs the Workshop on Consumption and Environment, Michael Maniates, Professor of Political Science and Environmental Science at Allegheny College, and Ken Conca, professor of Government and Politics at the University of Maryland, “Confronting Consumption,” Confronting Consumption, Chapter 2

Conducting such research within the framework of the supply-demand, producer-consumer dichotomy is important, as noted, because production has been the dominant focus not only in economics but in the economic strands of other disciplines. It may also be the safest research tact, given the hegemony of the economistic belief system. Unpacking the demand function for environmental impacts can enrich existing research traditions and inform policymaking and do so without challenging their underlying assumptions. But for those seeking a more transformative approach to environmental problems, an approach that goes beyond "environmental improvement," the prevailing dichotomy is probably more of a hindrance than an aid. It tends to constrain the analysis to market functioning (and malfunctioning) where "the environment" is merely an externality. A more radical approach, one that challenges this dichotomy and its propensity to relegate consumption to a black box or to the marginal status of emotion or personal values, is to treat all resource use as consuming and ask what risks are entailed in patterns of resource acquisi¬tion, processing, and distribution. This approach is more consistent with the ecological economics perspective where human economic activity is seen as an open subset of a finite and closed biophysical system.17 Consuming is that part of human activity that "uses up" material, energy, and other valued things.

#### Their evidence is epistemologically bankrupt – “*magic bullet*” technological solutions are falsified by academic and political support

Giampietro and Mayumi 9 – \*Professor of Environmental Science, \*\*Professor of Arts and Sciences

Mario Giampietro and Kozo Mayumi, “The Biofuel Delusion,” Google Book

As discussed earlier, the interest in energy alternatives to oil has been primed in this decade by two major issues: global warming associated with the green- house effect, and peak oil. Given these two problems, and ruling out the option that humans will consider alternative patterns of development not based on the maximization of GDP, it is almost unavoidable to conclude that what we need is a primary energy source that does not produce GHGs, and is renewable. For those not expert in the field of energy analysis (and in the analysis of the metabolism of complex adaptive systems) it is natural to come up with the simple sum 1 + 1 = 2 and conclude that producing biomass for biofuel kills two birds with one stone. For those supporting this idea, the gospel is always the same: • producing biomass for biofuel will absorb the CO2 that will be produced when using that biofuel, therefore this is a zero-emissions procedure; and • sincetheproductionofbiomassusessolarenergy,thesupplyofbiofuelfrom biomass is renewable. Hence, the substitution of barrels of oil with barrels of biofuel means that we need no longer question the myth of perpetual economic growth (the maximization of GDP growth and a perpetually expanding human population). Unfortunately, things are not that simple and the ‘magic solution’ is magic only in science fiction and in the promises made by politicians. But given that Western civilization is terrified by the idea that it could crumble like the great civilizations of the past, people desperately need to believe in the existence of a silver bullet that can solve sustainability problems. This explains why the myth of biofuels is a fantastic window of opportunity for both academic departments looking for research funds and politicians looking for an easy consensus. This point is well illustrated by fragments from a letter that US Senator Ken Salazar sent to the Colorado Springs Gazette (Box 9.1). In this situation, everyone has to jump on board the biofuel bandwagon to avoid being labelled as being against sustainability. It really does not seem to matter that the presumed economic benefits of biofuels, such as the creation of jobs in rural areas, completely ignore the biophysical foundations of the economic process. A larger requirement of jobs for a given activity not only provides income to families, but also increases the costs of those goods and services requiring too much labour. Suggesting that we move a big chunk of the workforce into agro-biofuel production in a developed country is similar to suggesting a return to harvesting crops manually to increase the number of jobs in agriculture. It is mistaken reasoning, even without considering the weak analyses of agro-biofuel sustainability. But in this situation of denial, scientific knowledge no longer matters. Even those who are sceptical and want to flag up the existence of serious problems with large-scale agro-biofuels must start out by confirming that agro-biofuels are the solution to our sustainability problem in order to gain the legitimacy and attention of the scientific community. This is illustrated by the following passage from a policy statement by the Ecological Society of America. The statement assumes – as did Senator Salazar – that the given target of biofuel production is a feasible one (Box 9.2).

### Alternative – Consumption Angle Key

#### The affirmative legitimates *infinite* consumption – only a production-centered alternative can reverse ecological overshoot and end stresses on social capacity

Princen 2 – Professor of Natural Resources @ U of Michigan

Thomas, Associate Professor of Natural Resources and Environmental Policy in the School of Natural Resources and Environment at the University of Michigan, where he also co-directs the Workshop on Consumption and Environment, Michael Maniates, Professor of Political Science and Environmental Science at Allegheny College, and Ken Conca, professor of Government and Politics at the University of Maryland, “Confronting Consumption,” Confronting Consumption, Chapter 1

This consumption angle on resource use offers a corrective to the production-centered perspective that dominates contemporary discussions of economic affairs, including environmental protection. In that perspective, raw materials feed manufacturing and distribution to produce what people want. It follows that, because goods are good and would not be produced if people did not want them, more goods—and more production—must be better. A productive economy is, as a result, one that produces more goods for a given input (thus increasing the economy’s ‘‘productivity’’), yields more choices for consumers, and increases output. When production creates problems such as pollution, the productive answer is to produce correctives such as scrubbers, ﬁlters, and detoxiﬁers. So goes the logic of production, productiveness, productivity, and products—construing all things economic as producing, as adding value, as, indeed, progress. The consumption angle turns this around to self-consciously construe economic activity as consuming, as depleting value, as risking ecological overshoot, as stressing social capacity.

### Alternative Solvency – Individual Questioning

#### Our individual ethical stance is itself political – building block for a larger and more influential movement

Muldoon 6 – MSW @ Carleton

Annie, “Where the Green Is: Examining the Paradox of Environmentally Conscious Consumption,” Electronic Green Journal, EBSCO

When discussing issues pertaining to environmental choices, it is helpful to view consumption as more than “an individual’s choice among goods. [It is also] a stream of choices and decisions winding its way through the various stages of extraction, manufacture, and final use, embedded at every step in social relations of power and authority” (Princen, Maniates & Conca, 2002, p. 12). Shopping for products can be a “significant part of an individual’s attempt to find meaning, status, and identity” (Princen, Maniates & Conca, 2002, p. 14). If this act is politicized, and understood to have corporate, social and environmental consequences, these individual choices can create a space for contemplation, deliberation and caution. As Brecher, Costello & Smith note, this can then become an arena where people discuss their everyday decisions, and begin to come together: This process may start with some people internally questioning or rejecting some aspects of the status quo [such as mass consumption at Christmas, or buying products from environmentally irresponsible companies]. It becomes a social process as people discover that others are . . . asking the same questions, and being tempted to make the same rejections . . . Seeing other people share similar experiences, perceptions and feelings opens up a new set of possibilities. Perhaps collectively we can act in ways that have impacts isolated individuals could never dream of having alone. And if we feel this way, perhaps others do, too. (2000, p. 20) As Kalle Lasn, one of the founders of Adbusters states “Individual change and collective action geared to enforcing corporate responsibility is the only way that we will together achieve our goals” (Maniates, 2002, p. 215). The goal of environmental awareness, conservation and protection is within reach, and green consumption is a venue where individual responsibility can meet communal activism.

### Impact – Environment

#### Consumption is the root cause of biodiversity loss – threatens extinction

--belief in technological fixes to climate change feed consumption and prevent consumption-centered solutions

Godhaven 9 - environmental writer and activist. He co-authored the Corporate Watch report Technofixes: A Critical Guide to Climate Change Technologies

Merrick, “Consumption: The Root Cause of Climate Change,” http://www.commondreams.org/view/2009/07/16-2

Technology is part of the solution to climate change. But only part. Techno-fixes like some of those in the Guardian's Manchester Report simply cannot deliver the carbon cuts science demands of us without being accompanied by drastic reductions in our consumption. That means radical economic and social transformation. Merely swapping technologies fails to address the root causes of climate change. We need to choose the solutions that are the cheapest, the swiftest, the most effective and least likely to incur dire side effects. On all counts, there's a simple answer – stop burning the stuff in the first place. Consume less. There is a certain level of resources we need to survive, and beyond that there is a level we need in order to have lives that are comfortable and meaningful. It is far below what we presently consume. Americans consume twice as much oil as Europeans. Are they twice as happy? Are Europeans half as free? Economic growth itself is not a measure of human well-being, it only measures things with an assessed monetary value. It values wants at the same level as needs and, while it purports to bring prosperity to the masses, its tendency to concentrate profit in fewer and fewer hands leaves billions without the necessities of a decent life. Techno-fixation masks the incompatibility of solving climate change with unlimited economic growth. Even if energy consumption can be reduced for an activity, ongoing economic growth eats up the improvement and overall energy consumption still rises. We continue destructive consumption in the expectation that new miracle technologies will come and save us. The hope of a future techno-fix feeds into the pass-it-forward, do-nothing-now culture typified by targets for 2050. Tough targets for 2050 are not tough at all, they are a decoy. Where are the techno-fix plans for the peak in global emissions by 2015 that the IPCC says we need? Even within the limited sphere of technology, we have to separate the solutions from the primacy of profit. We need to choose what's the most effective, not the most lucrative. Investors will want the maximum return for their money, and so the benefits of any climate technologies will, in all likelihood, be sold as carbon credits to the polluter industries and nations. It would not be done in tandem with emissions cuts but instead of them, making it not a tool of mitigation but of exacerbation. Climate change is not the only crisis currently facing humanity. Peak oil is likely to become a major issue within the coming decade. Competition for land and water, soil fertility depletion and collapse of fisheries are already posing increasing problems for food supply and survival in many parts of the world. Technological solutions to climate change fail to address most of these issues. Yet even without climate change, this systemic environmental and social crisis threatens society, and requires deeper solutions than new technology alone can provide. Around a fifth of emissions come from deforestation, more than for all transport emissions combined. There is no technological fix for that. We simply need to consume less of the forest, that is to say, less meat, less agrofuel and less wood. Our level of consumption is inequitable. Making it universal is simply impossible. The scientist Jared Diamond calculates that if the whole world were to have our level of consumption, it would be the equivalent of having 72 billion people on earth. With ravenous economic growth still prized as the main objective of society by all political leaders the world over, that 72 billion would be just the beginning. At 3% annual growth, 25 years later it would be the equivalent of 150 billion people. A century later it would be over a trillion. Something's got to give. And indeed, it already is. It's time for us to call it a crisis and respond with the proportionate radical action that is needed. We need profound change – not only government measures and targets but financial systems, the operation of corporations, and people's own expectations of progress and success. Building a new economic democracy based on meeting human needs equitably and sustainably is at least as big a challenge as climate change itself, but if human society is to succeed the two are inseparable. Instead of asking how to continue to grow the economy while attempting to cut carbon, we should be asking why economic growth is seen as more important than survival.

### Impact – Value to Life

#### Complicity with overconsumption leads to psychological violence and destroys value to life

Winter 3 – PhD in Psychology, Professor @ Whitman

Deborah, “The Psychology of Environmental Problems,” Google Book

Yet, there is good reason to believe that overconsumption is not de-livering the "goods." Empirical studies of people's happiness shows that it is not how much stuff people own, but the condition of their social relations, their work, and their leisure time that determines how much fulfillment people experience (D. G. Myers, 2002). We will discuss these studies in more detail in chapter 3, but the main point is that overconsumption does not lead to happiness. In fact, the race to pay for material possessions is more likely to detract from the quality of relationships, the creativity of our work, and the quantity of leisure time, the primary predictors of happiness. Attempting to meet psychological needs through overconsumption jeopardizes not only our physical habitat, but also our psyches (Kasser & Kanner, 2004).

### Impact – Ethics

#### There are *certain* negative environmental and social externalities that *can’t* be predicted – this should incite extreme caution and an ethical rejection of consumption

Cuccuzzella 9 – PhD Candidate @ U of Montreal

Camela, “AN EVALUATION AND INNOVATION FRAMEWORK FOR RESPONSIBLE DESIGN BASED ON PRUDENCE,” 8 th European Academy Of Design Conference, SSRN

According to Princen (2005, p.360) “in North America and increasingly elsewhere, the goals of the economy are to maximize return on investment and consumer choice, all at low, low prices.” All else is secondary; ecological integrity is an afterthought (Princen, 2005). In fact, as early as 1970, Baudrillard (1970) recognized that humans were at a point where consumption has grasped all aspects of their lives. Princen (2005) claims that the transition from an over-consuming society to a sustainable society; from an economy founded on efficiency gains to an economy premised on social equity and ecological integrity is necessarily based on a serious consideration of a sense of ‘enoughness’ (or sufficiency). In this perspective a few social organizing principles make good common sense; principles such as precaution, reverse onus, polluter pays and restraint and respite (Princen, 2005). This is one reason why Van Der Ryn & Cowan (2007) question the benefit of technological sustainability. They challenge the idea that this approach for sustainability may actually be “simply a kinder, gentler form of reductionism in which we do a more efficient job of using up, accounting for and managing nature” (p.21). Many technical innovations are fundamental for the long-term well-being of humanity. But it is important to consider the consequences of technical innovations in light of the thesis of counter-productivity by Illich (1978). This implies that in some cases, technological innovations present consequences contrary to what was intended. For example, the introduction of cars, initially a form of leisure but later adopted as a form of wide-spread mobility, has resulted in immobility because of its over-production and over-use by society. This is contrary to the intention of the invention of the car. This perspective is a broader perspective of the impacts of technological innovations. By considering the counter-productivity thesis by Illich (1978) when assessing innovations, a precautionary perspective is adopted because the long-term and possible global consequences are considered. Here, the threshold of use is a serious consideration. Therefore, the value of the usage of such technical innovations then also becomes a fundamental concern for the future of humanity (Jonas, 1985, Gollier et al., 2000, Dupuy, 2002, Arendt, 1958). An example of where the thesis of counter-productivity by Illich (1978) becomes relevant is with the idea of eco-efficiency. Eco-efficiency largely depends on technical innovation and on reducing the impacts of products and services (Reisch and Scherhorn, 1999). When using eco-efficiency as a strategy for reducing impacts, it is a convincing and easily operational approach for design. However, the ecoefficiency of a product or service is only a small picture of the bigger whole (Van Der Ryn and Cowan, 2007, McDonough and Braungart, 2002, Droz and Lavigne, 2006, Princen, 2005). Eco-efficiency may be an appropriate strategy for increasing economic growth and wealth; however, it is not clear how useful it is with regards to environmental improvements (Mongeau, 2007). In fact eco-efficiency may lead to an ever increasing resource use rather than less because of the ever-increasing potential for rebound effects based on the resulting cost savings that are eventually transferred to the consumer (Latouche, 2006). In the end, a strategy of eco-efficiency may impede long term economic growth because resource shortage will pervade technical change - a counter-productive effect of eco-efficiency. When assessing the impacts, it is important to consider the wider perspective of consumption, and not just the assessment of the use phase of one product. In this broader perspective, other impacts are revealed (i.e. social acceptability which includes an assessment of the social necessity of the product or service), since the patterns on a macro scale can be observed, instead of the details on a micro scale. 4 ADDRESSING THE CHALLENGES So, the strategy of efficiency (based on the notion of the prevention of risks) only provides part of the operative opportunities necessary for sustainability. An approach of efficiency may solve problems at one level, but cannot consider problems at other levels, and therefore may contribute to the emergence of other problems by inhibiting a global vision of the situation (Hertwich, 2005). The idea of eco-efficiency is powerful in communicating the reduction of environmental impacts for a product or service, yet if it encourages mass consumption through direct or indirect effects, then eco-efficiency on its own as a design strategy is flawed. The system of changes possible to a society or a community through the introduction of a product or service (no matter how eco-efficient it may be) can have multiple ripple effects on a local, regional, national or international scale. Design cannot ignore this fundamental uncertainty. According to van der Sluijs (2007), both sustainability and precaution exist in a realm of high uncertainty and multi-disciplinary issues; referred to as post-normal science. Sustainable design, one dimension of sustainability, must consider the consequences of innovations on society, environment, culture, economics, etc. Therefore, it is not enough to ensure that the innovation has been produced and provisioned in an environmentally sound manner, but that the various other concerns are also considered. Chapman and Gant (2007, p.7) state that “The aim therefore must be to design in a way that promotes consumption models of long-term sustainability.” Changes in consumption models refer to social changes since they require humans to change the way in which they live their everyday lives. According to Wahl and Baxter (2008), the designer has become more of a trans-disciplinary facilitator, “At the nexus of values, attitudes, needs, and actions, designers have the potential to act as transdisciplinary integrators and facilitators.” (p.72). Transformational social innovations are therefore needed to address the current crisis where such innovations will challenge existing cultural and social norms and models and therefore the implication of the community becomes an integral and essential part of the design process. The question that remains is how can the community contribute to the design process so that the limitations of current modes of design are addressed in a context of sustainability?

### AT: Perm

#### Representations of nearly infinite new energy undercut the *perceived need* for change – doom the permutation because it removes the reason to question consumption in the first place – that’s Princen

#### Starting point DA – production-centrism is *inherently* unecological

Princen 2 – Professor of Natural Resources @ U of Michigan

Thomas, Associate Professor of Natural Resources and Environmental Policy in the School of Natural Resources and Environment at the University of Michigan, where he also co-directs the Workshop on Consumption and Environment, Michael Maniates, Professor of Political Science and Environmental Science at Allegheny College, and Ken Conca, professor of Government and Politics at the University of Maryland, “Confronting Consumption,” Confronting Consumption, Chapter 2

All these production-oriented measures fall within the realm of "environmental improvement.'” For a given level of harvest they generate more usable product or less environmental damage. But the harvest is, indeed, given—that is, given by demand, by some combination of human need and desire and agents to supply (or stoke) that demand. And all via a supply of money that exists completely outside of ecological carrying capacity. Such production-oriented measures may be able to accommodate more of the demand or ameliorate the environmental effects. But when demand continues to increase and then exceed supply (in an ecological sense), the real issue regarding overharvesting is, indeed, the de¬mand, not the supply. Better forest management practices, less wood waste, more efficient milling, lower transportation costs, rehabilitation, and set-asides will have little effect on the excessiveness of the demand.23 Use of the forest may appear to be a production issue, but when over-harvesring is the concern, it is really a consumption issue. For both analytic and behavior-change reasons, it should be investigated from the consumption angle. Before doing so, it is important to point out that the production angle starts with a set of conditions that, in contemporary industrial society, are taken as the baseline, the starting point from which all else progresses. What is more, this baseline is unecological. If policymakers want to increase employment, the central banker stimulates demand through the money supply and interest rates. Financial signals start in the capital city, work their way through planners, designers, and builders to retailers and processors and, eventually, in this case, to the timber owner, who hires more workers and develops new technologies to cut more trees. The financial stimulus occurs as if ecological constraints are irrelevant. Indeed, the financial signal exists completely independent of signals from the ecosystems that must adjust. Signals from elsewhere in the commodity chain operate similarly. If members of the wood-products industry want to capture market share in rot-resistant timber, say, they convince municipalities to mandate pressure-treated lumber in outdoor applications. What were once trash species become highly marketable and demand rises. Production again increases, and all as if there were no ecological constraint, as if ecosys¬tems were mere inputs to the economy, not a foundation of the economy. The production angle is, thus, inherently unecological. If countervailing biophysical signals happen to work their way from the forest to the timber owner to processors, distributors, and retailers (let alone to money-supply managers), they are overwhelmed by the presumption of net benefits from more production: producers produce goods, goods are good, more goods are better. Consumers benefit as revealed by their willingness to pay, (Note how the notion of consumer sovereignty is integral to the production angle.) But as many have argued, economic growth, conventionally defined and measured, can be "uneconomic," even on its own terms, let alone on ecological terms. It can lead to net harm, especially when ecosystem services, family and community integ-rity, and Future generations are taken into account.26 If the production angle is inherently unecological, if it naturally over-whelms feedback that would otherwise reveal long-term net harm, then the consumption angle, if it has analytic and policy utility, ought to do just the opposite. It should direct analytic attention to what is lost, to what risks are incurred when, in this example, the harvest rate exceeds the regenerative rate of the forest ecosystem. Following the framework outlined above, I begin the consumption angle within the production-consumption, supply demand dichotomy, then shift to material activity up and down the chain of resource-use decisions.

#### Footnoting DA – combining production and consumption approaches *converts* consumption into the language production

Princen 2 – Professor of Natural Resources @ U of Michigan

Thomas, Associate Professor of Natural Resources and Environmental Policy in the School of Natural Resources and Environment at the University of Michigan, where he also co-directs the Workshop on Consumption and Environment, Michael Maniates, Professor of Political Science and Environmental Science at Allegheny College, and Ken Conca, professor of Government and Politics at the University of Maryland, “Confronting Consumption,” Confronting Consumption, Chapter 1

When these do not work, forests must be set aside from production. If such measures push production offshore, then environmentalists must go offshore, too, helping other countries to develop their regulatory apparatus or promoting international environmental law and organization. In mustering their energies for these campaigns, the largest environmental organizations have spent considerably less time and effort questioning the forces that compel those ever-larger harvests, the ever-more-intensive use of a tract of timberland, and the unending search for new forest frontiers. They tend not to challenge whether society really ‘‘needs’’ more paper (let alone more paper per capita) or the lowest possible prices on wood products. That, once again, would be to enter into the forbidden territory of consumer sovereignty. An illustration comes from the 1999 annual meeting of the Governing Council of Resources for the Future (RFF), a U.S. natural-resources think tank staffed largely by economists. A member of RFF’s board of directors suggested that the size of new houses and the number of miles people drive daily are, as indicators of sustainability, moving in the wrong direction. ‘‘The environmental movement is very middle class,’’ she observed, ‘‘and its organizations do not challenge middle class values.’’ A deputy director of Environmental Defense—an inﬂuential American environmental NGO that works with business to achieve market solutions to environmental problems—replied to the effect that ‘‘while few environmentalists were willing to dispense with, for example, air conditioning, they are receptive to producing it with the least damage to the ecology.’’ She then observed that ‘‘everybody in China wants a car.’’ The statement is telling. When consumption concerns are raised in mainstream environmental circles, they are too often dismissed on their own terms, readily converted to questions of production and technology (see boxes 1.2 and 1.3), or shunted off as someone else’s problem in the form of looming developments in faraway places. Perhaps for reasons of political calculation, perhaps out of fear or an inability to challenge mainstream consumer values, there is a much greater willingness to examine the way things are done, especially the way things are produced, than to question the purposes served or not served by the doing of those things.

#### The 1ac *directs* attention away from consumption

Princen 2 – Professor of Natural Resources @ U of Michigan

Thomas, Associate Professor of Natural Resources and Environmental Policy in the School of Natural Resources and Environment at the University of Michigan, where he also co-directs the Workshop on Consumption and Environment, Michael Maniates, Professor of Political Science and Environmental Science at Allegheny College, and Ken Conca, professor of Government and Politics at the University of Maryland, “Confronting Consumption,” Confronting Consumption, Chapter 1

Perhaps it is no surprise, then, that comforting terms like sustainable development have come to frame the dominant environmental discourse in North America, where the contributors to this volume live and work. Those who developed the term—a concept that suffused the 1992 Earth Summit in Rio de Janeiro and, to this day, reverberates powerfully through the environmental debate—deﬁned sustainable practice as actions that meet the needs of current populations without endangering the prospects and livelihoods of future generations. 1 Just what constitutes the needs of today’s people remains blurred, out of focus, even usefully ambiguous: everyone has become adept at talking about sustainability without having to wade into the treacherous waters of consumption. Consequently, much that is said today in the name of sustainability continues to stress the familiar environmental themes of population (too large), technology (not green enough), and economic growth (not enough of it in the right places). Consumption occasionally enters the discussion, but only in nonthreatening ways, and most often in the form of calls for ‘‘green consumption’’ or in support of some moral imperative to consume recycled or recyclable products. Much of this sustainable development talk steers clear of escalating consumption levels and, especially, the roots of such escalation. In the United States, for example, conventional wisdom casts recycling as a primary mechanism for mass publics to ‘‘save the planet’’ without confronting the hard truth that recycling can be a reward for ever-increasing consumption. Questions about driving forces and the impact of consumption continue to hang there, unaddressed. They are like the proverbial 800-pound gorilla in the living room that almost everyone chooses to ignore.

### AT: Economy Impact

#### Only *unequal* growth leads to war – the alternative is a necessary structural remedy

Ahearne 9 – MA in Conflict, Development and Security

James, “Neoliberal Economic Policies and PostConflict Peace-Building: A Help or Hindrance to Durable Peace?,” Polis Journal, http://www.polis.leeds.ac.uk/assets/files/students/student-journal/ma-winter-09/james-ahearne-winter-09.pdf

This chapter argues for the importance of socio-economic disparities in conflict causation. Grievance based theories of conflict – relative deprivation (Gurr 1970) and horizontal inequality (Stewart 2000) – are utilised in support of this claim. It is argued that the relative position of people vis-a-vis one another and their expectations is most often the keyeconomic variable in explaining the outbreak of conflict. Consequently, in such situations if a long lasting, durable peace is to be established, post-conflict economic policy should not simply be concerned with overall economic growth but should also have a strong focus on the type of growth. Is it equitable? Is it benefitting traditionally marginalised areas? In short, is it addressing the relative disparities between groups that sparked conflict? The chapter is structured as follows: A brief review of the contemporary debate on the causes of conflict serves to illustrate the importance of socio-economic factors to contemporary conflict causation. This is followed by an overview of theories of grievance and conflict causation to explain how socio-economic factors generate conflict – i.e. the importance of relative poverty. Finally we take a look at some empirical evidence in support of grievance theories to situate their relevance to contemporary conflict and illustrate how the **relative position** of groups can drive armed conflict. Having located the significant role of socio-economic factors in conflict causation it will then be possible to move on and assess the utility of post-conflict economic policy for dealing with such issue.

#### Substantial empirical evidence supports our economic theory – socio-economic inequality is the key driving force of conflict

Ahearne 9 – MA in Conflict, Development and Security

James, “Neoliberal Economic Policies and PostConflict Peace-Building: A Help or Hindrance to Durable Peace?,” Polis Journal, http://www.polis.leeds.ac.uk/assets/files/students/student-journal/ma-winter-09/james-ahearne-winter-09.pdf

Much of the contemporary debate on the causes of armed conflict presents a ‘greed vs. grievance’ dichotomy. On the one hand ‘Greed’ thesis (Collier and Hoeffler 2001, also see Berdal 2005) argues that it is principally greed motivated rebel economic opportunity that explains conflict, i.e. rebel insurgents pursue conflict for economic gain and countries with significant ‘lootable’ natural resources (diamonds, timber etc) are at a high risk of conflict. On the other hand greed thesis is countered by a long-standing body of literature in political science which holds that collective violence can be the result of relative deprivation (Gurr 1970) and the ‘grievance’ this produces amongst members of a collectivity (Hutchful and Aning 2004, Boas and Dunn 2007). For grievance accounts of conflict socio-economic factors are of central importance. Other factors such as lack of political rights, government corruption and incompetence may also be involved but as Stewart (2000: 9) sums up “in general if there is a group conflict, we should expect sharp economic differences between conflicting groups associated (or believed to be associated) with differences in political control” Both greed and grievance accounts of conflict have merit but taken individually they often fail to illuminate some key aspects of what drives conflict, in particular for example it is worth noting that, as Murshed and Tajoeddin (2008: 96) argue, greed may indeed play a significant role in driving conflict but the presence of grievance is also always necessary for group formation and collective violence to take place – conflict cannot proceed without clearly perceived group grievance. Increasingly scholars accept that a nuanced understanding of any conflict should understand that both greed and grievance can play central roles in driving collective violence and that drivers of conflict should be understood more in terms of a greed – grievance continuum rather than an either/or dichotomy (Korf 2006). Thus whilst the relative importance of greed or grievance may vary from case to case the fact is that socio-economic grievances are a major contributor to the onset of violent civil conflict in the contemporary era, and we can rarely discount them when speaking of the causes of conflict. There are numerous examples across the globe where inequality and other socio-economic grievances have been a highly important contributing factor driving contemporary civil conflicts. South America is a prime example of this; El Salvador, Nicaragua and Guatemala all endured lengthy armed conflicts which lasted into the 1990’s and had a strong class dimension. As Paris (2004) argues when speaking of the region “inequality between the impoverished majority and the affluent minority has been the most important cause of the region’s recurring bouts of revolutionary violence” (Paris 2004: 113). Elsewhere, in Africa the rebel groups of the Niger Delta demand a more equal distribution of the oil wealth. Some cite this as an example of greed driving conflict but as numerous authors have argued (Watts 2007, Ukiwo 2007) the conflict cannot truly be understood without reference to issues of socio-economic grievance. Ukiwo concludes; “the explanations of the insurgency in the region... can be found not in the greed of militant groups or their leaders but in the longstanding history of marginalization and inequality, as well as the failure of the state and the oil industry to address these grievances except at gunpoint” (Ukiwo 2007: 610). In Sierra Leone (which will be discussed in depth in chapter three) most scholars now agree that the marginalisation of the country’s youth was one of the, if not the, most important factors contributing to the onset of armed conflict (Peeters et al 2009). In sum even a brief acquaintance with the literature on contemporary civil conflict makes it very difficult to ignore socio-economic grievances as a key variable in the onset of armed violence.

### AT: Tech Good

#### “*Scaling up*” technological solutions leads to unending violence and continual environmental destruction

Levene 10 – Reader @ Southhampton

Mark Levene, Reader in Comparative History at Southampton University and a member of the Parkes Institute for Jewish/ non-Jewish relations. He writes extensively on genocide and related themes. He is also a long-term peace and environmental activist, co-founder of Crisis Forum, Future Ethics, pg. 60-61

I will argue in this chapter that the dominant heroictechnological mode of contemporary secular apocalyptic is itself indicative of a pervading, mostly, unwritten premise of today’s Western hegemonic system: namely, that there are heavy-duty technical fixes to all problems, and that in the event of some overwhelming global, environmental or other catastrophe, the appropriate response is to scale them up accordingly – regardless of the ultimate consequences. If this, on the one hand, is simply a statement about Western society as a ‘technological society’ (Ellul, 1965; Shaw, 2010) it also carries political and military implications which reinforce the widening gap between elite power as largely exercised by state security, scientific and corporate elites, and the rest of us. In short, in the face of an accelerating pace of human-induced global warming, not only will ‘we’ – the populace – be required to acquiesce to what the Nazi jurist, Carl Schmitt, from a more overtly totalitarian historic moment, would have called ‘the state of exception’ (Slomp, 2009), but to ‘solutions’ which are likely to exacerbate the drive, on the one hand, to mass exterminatory violence, on the other, to all-encompassing environmental disaster

### AT: Consumption Inevitable

#### Consumption is not inevitable

Jackson 5 – Professor of Environmental Strategy @ Surrey

Tom, “Live Better by Consuming Less?,” Journal of Industrial Ecology, Volume 9, Number 1–2, Scholar

On the other hand, it seems to me that the symbolic interactionist approach does offer some particularly promising insights for sustainable consumption. At the very least, the social anthropology and philosophy of consumer behavior does not preclude the possibility of negotiating or renegotiating the conditions and the means under which “marking services,” for example, are exchanged. Moreover, the insight that a certain amount of consumer behavior is dedicated to an (ultimately ﬂawed) pursuit of meaning opens up the tantalizing possibility of devising some other, more successful and less ecological damaging strategy for pursing personal and cultural meaning. This is not, in any sense, a simple task, nor one that can easily be pursued by any given individual or set of individuals. On the contrary, it is a fundamentally social and cultural project, which will require sophisticated policy interventions at many different levels (Jackson and Michaelis 2003; Jackson 2005). Nonetheless, it remains a very real possibility that we could collectively devise a society in which it is possible to live better (or at least as well as we have done) by consuming less, and become more human in the process.

## States Counterplan

### 1nc

#### The 50 states, DC and territories should form an interstate compact that facilitates regulated pipeline transportation of captured carbon in the United States.

#### The counterplan solves – avoids delay, leads to a coordinated response and reduces private sector uncertainty

Amann 10 Scholarly Group of Environmental and Energy Experts (Rachel Amann, December 31, 2010, “A Policy, Legal, and Regulatory Evaluation of the Feasibility of a National Pipeline Infrastructure for the Transport and Storage of Carbon Dioxide: Interstate Oil and Gas Compact Commission,” [http://www.sseb.org/downloads/pipeline.pdf)//DR](http://www.sseb.org/downloads/pipeline.pdf%29//DR). H

An interstate advisory compact may be the most likely model for developing an interstate CO2 pipeline network for a number of reasons. An advisory compact is most likely to develop on a regional basis in response to market demands. Such a compact also facilitates better collaboration among states because the group is smaller and therefore able to tailor its response to the needs of the local area or region, avoiding a one-size-fits-all approach. The collaborative efforts of a regional advisory compact will foster development of uniform criteria, shared timelines, joint hearings, and coordinated response in regulating a CO2 pipeline network. Further, the advisory compact is more palatable to states and allows states to retain their sovereign authority**.** A regional advisory compact may result in a more rapid creation of a regulatory framework than the creation of a federal regulatory framework. A regional advisory compact reduces the regulatory uncertainty resulting from the absence of a regulatory framework needed to address a national CO2 pipeline infrastructure. An important advantage of advisory compacts is their potential for quick development and rapid regulatory response. Advisory compacts can sometimes form quickly whereas federal regulation may at times require many years. The speed by which the compact is formed is directly related to the number of participating states. Advisory compacts also allow for a quicker and more efficient regulatory response because of the proximity between the regulated community and the regulators**.**

### Solvency

USFG not key—states solve better

Amann 10 Scholarly Group of Environmental and Energy Experts (Rachel Amann, December 31, 2010, “A Policy, Legal, and Regulatory Evaluation of the Feasibility of a National Pipeline Infrastructure for the Transport and Storage of Carbon Dioxide: Interstate Oil and Gas Compact Commission,” http://www.sseb.org/downloads/pipeline.pdf)//DR. H

Today, no federal role is required in order to develop CO2 pipeline projects. The assumption that a federal mandate will produce the desired result (capture, transportation, and storage of nationally produced CO2) may not follow. Other state-based regulatory solutions should be carefully considered before pursuit of an untested federal strategy that could prove harmful to future CO2 pipeline construction.

#### Status quo pipelines prove

Amann 10 Scholarly Group of Environmental and Energy Experts (Rachel Amann, December 31, 2010, “A Policy, Legal, and Regulatory Evaluation of the Feasibility of a National Pipeline Infrastructure for the Transport and Storage of Carbon Dioxide: Interstate Oil and Gas Compact Commission,” http://www.sseb.org/downloads/pipeline.pdf)//DR. H

The current pipeline infrastructure was sited, constructed, and regulated by the states in which they operate with federal oversight limited to safety regulations or instances where federal lands are traversed. Today, no federal involvement is required to facilitate the development of CO2 pipelines.

#### The federal government has explicitly disavowed jurisdictional authority

Wolfe 10Holland and Hart Law Firm, Over 400 Lawyers (Lawrence J. Wolfe, September 30, 2010, “TRANSPORTING CO2 – ACCELERATING PIPELINE INFRASTRUCTURE DEVELOPMENT,” [http://www.hollandhart.com/articles/Wolfe\_CCSPPT\_SummitWashDC.pdf)//DR](http://www.hollandhart.com/articles/Wolfe_CCSPPT_SummitWashDC.pdf%29//DR). H

Siting of new CO2 pipelines is not regulated by any Federal agency. Both FERC and the STB (and predecessor agency ICC) have declined jurisdiction over CO2 pipelines.

Siting is currently left to the States.

Rates charged by CO2 pipelines are not regulated by any Federal agency, except the STB will hear complaints about rates.

No Federal eminent domain for CO2 pipelines

### Solvency – AT: Eminent Domain

#### States solve – have power of eminent domain and can successfully site

Pitlick and Nordhaus 09Pitlick: Associate at Van Ness Feldman, Nordhaus: Member of the Washington, D.C. law firm, Van Ness Feldman, P.C., serves on the adjunct faculty at George Washington University Law School, Served as General Counsel of the Department of Energy and of the Federal Energy Regulatory Commission (Robert R. Nordhaus, Emily Pitlick, 2009, “CARBON DIOXIDE PIPELINE REGULATION,” [http://felj.org/docs/elj301/85\_-\_nordhaus\_and\_pitlick.pdf)//DR](http://felj.org/docs/elj301/85_-_nordhaus_and_pitlick.pdf%29//DR). H

As a general matter, the states and not the federal government are responsible for siting both interstate and intrastate CO2 pipelines. In the states reviewed, CO2 pipeline project sponsors have eminent domain authority, which facilitates the ability to site the pipelines there. The power of eminent domain allows pipeline developers to take lands for the public use of pipeline infrastructure development. Lands for pipeline construction are often obtained through leases, with the threat of eminent domain action looming over the transactions.

#### States will provide private industry with eminent domain – solves

Mack and Endemann 09Latham & Watkins, international law firm (Joel Mack, Buck B. Endemann, October 2, 2009, “Making carbon dioxide sequestration feasible: Toward federal regulation of CO2 sequestration pipelines,” [http://lw.com/upload/pubContent/\_pdf/pub3385\_1.pdf)//DR](http://lw.com/upload/pubContent/_pdf/pub3385_1.pdf%29//DR). H

At present, CO2 pipelines are regulated individually by the states in which they are located, for the most part under the states’ common carrier regimes or statutory schemes that approximate common carrier requirements (Yarbrough, 2008). Almost all of the existing CO2 pipelines service EOR projects, although Michigan’s short pipeline is dedicated to a US Department of EnergyCO2 sequestration demonstration project.11 EOR has been used for decades, and it involves a variety of technologies that are used to enhance the yields from mature oil fields. As one of the available EOR technologies, CO2based EOR involves capturing CO2 from a man-made source or naturally occurring reservoir, piping it tens or hundreds of miles away, and injecting it deep underground to extend production from mature oil fields. Traveling from the source to the injection site, the pipelines cross through federal, state, and private lands and often traverse state lines. Generally, state regulations allow CO2 pipeline companies to use eminent domain for securing necessary rights of way across state and private lands, a right sometimes conditioned on using the CO2 for tertiary oil recovery. This right of eminent domain turns upon the pipeline serving a ‘‘public use,’’ whether that use is demonstrated by the pipeline company or already embodied by state statute. Although the states’ general public use regimes share a few similarities, the level and detail of regulation varies greatly from state to state. Ten states contain the bulk of the United States’ 3600miles of CO2 pipeline: Colorado, Louisiana, Michigan, Mississippi, New Mexico, North Dakota, Oklahoma, Texas, Utah and Wyoming. Not surprisingly, states with a longer history of using CO2 for EOR have more specific laws regulating CO2 pipeline siting and rate-setting. For instance, Louisiana, NewMexico, Texas, andMississippi (which collectively host the bulk of the existing CO2 pipeline infrastructure) have statutes that specifically address pipeline transportation of CO2.12 In Louisiana and New Mexico, the CO2 pipeline company’s right of eminent domain is closely tied to statutory policies furthering EOR or the production of petroleum products for ultimate public benefit.13 Mississippi’s eminent domain statute, for example, has a section specifically granting oil, gas, and EOR-related CO2 pipelines the power of condemnation.14 In each of these states, given the close statutory relationship between CO2 pipelines and producing oil for public use, CO2 pipeline transporters can readily prove the ‘‘public use’’ prerequisite for right of way condemnation. Moreover, these states have interpreted ‘‘public use’’ broadly when contemplating eminent domain for any facilities related to producing natural resources, even for pipelines serving an intermediary role to a single, private customer.15

### Solvency – Interstate Compacts

#### Interstate compacts solve every 1ac solvency deficit

Amann 10

Rachel, Scholarly Group of Environmental and Energy Experts, December 31, 2010, “A Policy, Legal, and Regulatory Evaluation of the Feasibility of a National Pipeline Infrastructure for the Transport and Storage of Carbon Dioxide: Interstate Oil and Gas Compact Commission,” http://www.sseb.org/downloads/pipeline.pdf

Elements of the Status Quo, Multi-state Compact Option, or the Natural Gas Pipeline Models (NGPM) may be useful for further study to determine which are most compatible with the various business models discussed earlier. The status quo where CO2 pipeline regulation is left to the states and handled on a state-by-state basis has resulted in the development of more than 4,000 miles of CO2 pipeline to date. The current level of oversight provided by the federal government through the Office of Pipeline Safety and its safety regulations is both effective and sufficient as indicated by 40 years of safe operation of CO2 pipelines. Although this option is best suited to intrastate networks, there is no indication that continued operation under the current regulatory framework would inhibit interstate or intrastate pipeline development. The multi-state compact option that allows states to act collectively through shared/common regulatory provisions may offer unique advantages over the status quo decentralized system or a future centralized, federal regulatory system. Compacts can be structured uniquely to accommodate any business model. Furthermore, while maintaining state sovereignty, compacts provide a streamlined process for developing interstate infrastructure that encompasses multiple jurisdictions. Pipeline developers would have greater certainty as requirements for operating across multiple jurisdictions would be readily known, thereby saving time in navigating multiple regulatory requirements and expediting and streamlining the permitting process, saving operators both time and money as they seek to permit future CO2 pipelines. However, a disadvantage to the compact option is the potential for creating geographic windows or competing compacts that would diminish regulatory consistency.

#### Interstate compacts solve

Amann 10Scholarly Group of Environmental and Energy Experts (Rachel Amann, December 31, 2010, “A Policy, Legal, and Regulatory Evaluation of the Feasibility of a National Pipeline Infrastructure for the Transport and Storage of Carbon Dioxide: Interstate Oil and Gas Compact Commission,” [http://www.sseb.org/downloads/pipeline.pdf)//DR](http://www.sseb.org/downloads/pipeline.pdf%29//DR). H

Interstate compacts represent an opportunity for the kind of multi-state cooperation that could promote the development of a national CO2 pipeline network. They facilitate multi-state cooperation, reinforce state sovereignty, and avoid federal intervention. Because broad public policy issues -- such as developing a national network of CO2 pipelines that cross jurisdictional boundaries -- present new governing challenges to state authorities a multi-state compact could be useful. Compacts enable states – in their sovereign capacity – to act jointly and collectively, generally outside the confines of the federal legislative or regulatory process**.** Compacts afford states the opportunity to develop dynamic, self-regulatory systems over which the participating states can maintain control through coordinated legislative and administrative procedures. Compacts enable states to develop adaptive structures that can evolve to meet new and increased challenges that naturally arise over time. Interstate compacts are contracts between two or more states creating an agreement on a particular policy issue, adopting a certain standard, or cooperating on regional or national matters. Interstate compacts provide a state-developed structure for collaborative and dynamic action to meet new and increased demands over time.

### Solvency – AT: Interstate Compacts Require Congress

#### Interstate Compacts don’t have to go through Congress—empirics

Pincus 09 (Mathew, April 22, 2009, “When Should Interstate Compacts Require Congressional Consent?” Columbia Journal of Law and Social Problems, [http://www.columbia.edu/cu/jlsp/pdf/Summer2009/02Pincus.42.4.pdf)//DR](http://www.columbia.edu/cu/jlsp/pdf/Summer2009/02Pincus.42.4.pdf%29//DR). H

Nonetheless, certain agreements between states were always thought to be exempt from the congressional consent requirement under both the Articles of Confederation’s and the Constitution’s versions of the clause. The Virginia-Maryland Compact of 1785, which governed the Potomac River, the Pocomoke River, and the Chesapeake Bay, did not receive congressional approval, yet questions concerning its validity under the Articles of Confederation never arose.23 Likewise, states concluded numerous boundary agreements in the first few decades after the Constitution was enacted without Congress’s consent. Courts almost universally sustained the validity of these agreements.24 All in all, in the years after the enactment of the Constitution but prior to 1921, only thirty-six of the numerous compacts between states received the consent of Congress.25 From these facts, it seems clear that in the period when the Constitution was adopted, the Compact Clause was not viewed as applying precisely as written; some set of compacts — perhaps only those that settled boundaries between states — were always viewed as outside of the requirement of congressional consent.

#### Recent examples prove

Pincus 09 (Mathew, April 22, 2009, “When Should Interstate Compacts Require Congressional Consent?” Columbia Journal of Law and Social Problems, [http://www.columbia.edu/cu/jlsp/pdf/Summer2009/02Pincus.42.4.pdf)//DR](http://www.columbia.edu/cu/jlsp/pdf/Summer2009/02Pincus.42.4.pdf%29//DR). H

The last few years have seen ambitious efforts to utilize interstate compacts to address particularly tough national issues. In the environmental arena, the Regional Greenhouse Gas Initiative (“RGGI”), which came into effect in September of 2008,41 originated as a response to federal inaction in the face of rising greenhouse gas levels.42 The RGGI obliges signatory states to implement a cap and trade arrangement for carbon dioxide emissions from power plants. States will freeze emissions at approximately current levels and reduce them over the following decade while allowing power plants to trade emissions credits among themselves. 43 Currently, ten states have joined the RGGI.44 It seems likely that, under the current U.S. Steel test, the RGGI would not be found to require congressional approval.45

### AT: State Parks DA

#### State parks can adjust to budget cuts- no threat of closure

**Keating 10** (Michael, senior editor at *The American City & Council*, “State Parks Adjust to Budget Cuts,” *The American City & Council*, March 31, 2010, *Proquest*, ADP)

In Idaho, state parks and recreation agencies are facing $4.5 million in budget cuts as the state heads into FY 2011. Instead of closing three of Idaho's 30 state parks to balance its budget, the Idaho Park and Recreation Board has voted to keep all parks open. The board will reduce services and close some parks on a seasonal basis to keep expenses in line. Idaho Department of Parks and Recreation (IDPR) director Nancy Merrill outlined the department's budget-saving strategy: "During the next year, the agency's goal will be to focus on generating revenue to maintain operations long-term. The good news is, our 30 state parks will remain open for public enjoyment, and we're confident that our very supportive customers will understand that changes were necessary."

#### Park Budgets increasing

**Eckroth 09** (LeAnn, government reporter for the Bismarck Tribune, “Parks’ Preliminary Budget Approved,” *Bismarck Tribune*, August 25, 2009, *Proquest*, ADP)

The Bismarck Park Board approved a $15.08 million preliminary 2010 budget Thursday. General fund expenses will total $10.72 million, compared to $9.43 million in 2009. Operating expenses for a future aquatics center and hosting the Prairie Rose games are credited with part of the spending increase. Finance manager Augie Ternes said the park district expects to receive $7.14 million in property tax money after early payment credits are factored in. The park district's special revenue funds total $2.66 million; this includes $1.84 million in special assessments. The balance of the revenue will be generated from various programs, management contracts and fees the park district collects. Parks and Recreation Director Steve Neu said about half the revenue for the park district comes from non-property tax dollars. "That 52 percent is fees being paid by participants, sponsorships, grants we can generate and fees that help make it up," he said. Parks improvements Five mills will be levied to raise $1.7 million for capital improvement projects throughout the park system. Neu said about $2.5 million in capital improvements are planned for 2010. These involve various phases of park development to be paid for by the general fund, special assessments and construction fund. Hillside will get new shelter work, playgrounds and new restrooms. Four new ball fields will be added at Pebble Creek; asphalt work, parking lots and a new driving range shack are part of new features planned. "At New Generations Park, we're looking at water and sewer, installation of electricity, parking lot, and a shelter up there," Neu said. "At Cottonwood Park, we've got (21/2 miles of) trail projects planned."

#### The Let’s Move initiative is helping to solve obesity

**The New York Time 2012** (Lets Move, She Said – And We Did http://opinionator.blogs.nytimes.com/2012/02/13/lets-move-she-said-and-we-have/)

During the first spring of the Obama presidency, the First Lady broke ground on a White House vegetable garden. Then, in February 2010, she announced the [Let’s Move](http://www.nytimes.com/2010/02/10/health/nutrition/10obesity.html) initiative, a campaign to change the way America’s children eat and exercise, with the goal of ending childhood obesity in a generation. In the years since, what has Michelle Obama’s work accomplished, besides (and I can say this from experience) the harvesting of some delicious lettuce, green beans and honey? The answer is: a lot. One of the most important results has been increasing public awareness of the importance of obesity. In 2008, over two-thirds of adults and a third of adolescents and children in the United States were obese or overweight. Although most Americans already saw obesity as a major problem, a majority opposed increasing federal spending to combat it. This attitude has begun to change. By 2011, a Pew survey found that most Americans believe the government should play a significant role in reducing obesity among children. Today, 80 percent of Americans acknowledge that childhood obesity is a serious problem. Mrs. Obama’s campaign has also led to improvements in the access to and content of school meals — which are where many children get the bulk of their calories and nutrition. In late 2010, the lame-duck Congress passed the Healthy, Hunger-Free Kids Act which, for the first time in 30 years, increased funding for school breakfasts and lunches above the inflation rate. The act also gives the Agriculture Department authority to set health standards for all foods sold on school property — including those in vending machines. Best of all, it reduced government paperwork to establish eligibility for free or reduced-price school meals, ensuring that tens of thousands more children will get healthy food they need.

## Renewables Tradeoff DA

### 1nc

#### US is leading the clean-tech race now

Swartz 11

Jon, May, “Big companies aggressively jump into clean tech,” http://www.usatoday.com/tech/news/2011-05-25-green-tech-investing\_n.htm

A few years ago, investing in green technology companies in Silicon Valley was as de rigueur as vertical social-media sites. Those sites went away, but money **continues to pour** into clean-tech ventures as world events dictate a serious look at alternative energy sources such as solar, wind and electric cars. "It's not alternative: We think of it as mainstream," says Alan Salzman, CEO of VantagePoint Capital Partners, an investor in electric-car maker Tesla Motors, which went public last year, and BrightSource Energy, slated for an IPO in 2011. It's hard to put a price tag on the potential market for clean technologies. Several venture capitalists interviewed say it could be hundreds of billions of dollars — if not more — when adding up various slices, such as wind (estimated $60 billion) and solar ($20 billion to $30 billion). There is little doubt what VCs think: They poured $4.9 billion into domestic start-ups last year, up 40% from 2009, says market researcher Cleantech Group. The numbers suggest "strong long-term VC interest," says Sheeraz Haji, an analyst at Cleantech Group who notes that an increase in the average size of deals shows a "continued bias towards later-stage deals." Clean tech is as hot as the rest of the tech industry. Start-ups are raking in record amounts of investments. Large, established companies such as Intel are pursuing partnerships with up-and-coming companies. Promising start-ups are being snapped up as acquisitions. Initial public offerings are sprouting like vegetables. In other words, expect the momentum to continue. World events and economic factors have thrust early clean-tech companies into the positions of being — potentially — influential trendsetters in battery technology, solar energy, wind power and electric cars, says Erik Straser, general partner at Mohr Davidow Ventures, an investor in Nanosolar, Recurrent Energy and others. "Each of these companies is an exciting little story that, put together, creates a **huge, transformational picture**" in energy use, he says.

#### The plan trades off – it undercuts the political will for renewables

Parfomak and Folger 7 - \*Specialist in Energy and Infrastructure Resources, Science, and Industry Division, \*\*Specialist in Energy Policy Resources, Science, and Industry Division

Paul and Peter, CRS Report for Congress, “Carbon Dioxide (CO2) Pipelines for Carbon Sequestration: Emerging Policy Issues,” Scholar

In addition to these issues, Congress may examine how CO2 pipelines fit into the nation’s overall strategies for energy supply and environmental protection. The need for CO2 pipelines ultimately derives from the nation’s consumption of fossil fuels. Policies affecting the latter, such as energy conservation, and the development of new renewable, nuclear, or hydrogen energy resources, could substantially affect the need for and configuration of CO2 pipelines. If policy makers encourage continued consumption of fossil fuels under CCS, then the need to foster the other energy options may be diminished — and vice versa. Thus decisions about CO2 pipeline infrastructure could have consequences for a broader array of energy and environmental policies.

#### Clean tech leadership averts global war – independently turns warming and economy

Klarevas 9 – Professor of Global Affairs

Louis, Professor at the Center for Global Affairs – New York University, “[Securing American Primacy While Tackling Climate Change: Toward a National Strategy of Greengemony](http://www.huffingtonpost.com/louis-klarevas/securing-american-primacy_b_393223.html)”, Huffington Post, 12-15, http://www.huffingtonpost.com/louis-klarevas/securing-american-primacy\_b\_393223.html

By not addressing climate change more aggressively and creatively, the United States is squandering an opportunity to **secure its global primacy** for the next few generations to come. To do this, though, the U.S. must rely on innovation to help the world escape the coming environmental meltdown. Developing the key technologies that will save the planet from global warming will allow the U.S. to **outmaneuver potential great power rivals** seeking to replace it as the **international system's hegemon**. But the greening of American strategy must occur soon. The U.S., however, seems to be stuck in time, unable to move beyond oil-centric geo-politics in any meaningful way. Often, the gridlock is portrayed as a partisan difference, with Republicans resisting action and Democrats pleading for action. This, though, is an unfair characterization as there are numerous proactive Republicans and quite a few reticent Democrats. The real divide is instead one between realists and liberals. Students of realpolitik, which still heavily guides American foreign policy, largely discount environmental issues as they are not seen as advancing national interests in a way that generates relative power advantages vis-à-vis the other major powers in the system: Russia, China, Japan, India, and the European Union. Liberals, on the other hand, have recognized that global warming might very well become the greatest challenge ever faced by mankind. As such, their thinking often eschews narrowly defined national interests for the greater global good. This, though, ruffles elected officials whose sworn obligation is, above all, to protect and promote American national interests. What both sides need to understand is that by becoming a lean, mean, green fighting machine, the U.S. can actually bring together liberals and realists to advance a collective interest which benefits every nation, while at the same time, securing America's global primacy well into the future. To do so, the U.S. must re-invent itself as not just your traditional hegemon, but as history's first ever green hegemon. Hegemons are countries that dominate the international system - bailing out other countries in times of global crisis, establishing and maintaining the most important international institutions, and covering the costs that result from free-riding and cheating global obligations. Since 1945, that role has been the purview of the United States. Immediately after World War II, Europe and Asia laid in ruin, the global economy required resuscitation, the countries of the free world needed security guarantees, and the entire system longed for a multilateral forum where global concerns could be addressed. The U.S., emerging the least scathed by the systemic crisis of fascism's rise, stepped up to the challenge and established the postwar (and current) liberal order. But don't let the world "liberal" fool you. While many nations benefited from America's new-found hegemony, the U.S. was driven largely by "realist" selfish national interests. The liberal order first and foremost benefited the U.S. With the U.S. becoming bogged down in places like Afghanistan and Iraq, running a record national debt, and failing to shore up the dollar, the future of American hegemony now seems to be facing a serious contest: potential rivals - acting like sharks smelling blood in the water - wish to challenge the U.S. on a variety of fronts. This has led numerous commentators to forecast the U.S.'s imminent fall from grace. Not all hope is lost however. With the impending systemic crisis of global warming on the horizon, the U.S. again finds itself in a position to address a transnational problem in a way that will benefit both the international community collectively and the U.S. selfishly. The current problem is two-fold. First, the competition for oil is fueling animosities between the major powers. The geopolitics of oil has already emboldened Russia in its 'near abroad' and China in far-off places like Africa and Latin America. As oil is a limited natural resource, a nasty zero-sum contest could be looming on the horizon for the U.S. and its major power rivals - a contest which threatens American primacy and global stability. Second, converting fossil fuels like oil to run national economies is producing irreversible harm in the form of carbon dioxide emissions. So long as the global economy remains oil-dependent, greenhouse gases will continue to rise. Experts are predicting as much as a 60% increase in carbon dioxide emissions in the next twenty-five years. That likely means more devastating water shortages, droughts, forest fires, floods, and storms. In other words, if global competition for access to energy resources does not undermine international security, global warming will. And in either case, oil will be a culprit for the instability. Oil arguably has been the most precious energy resource of the last half-century. But "black gold" is so 20th century. The key resource for this century will be green gold - clean, environmentally-friendly energy like wind, solar, and hydrogen power. Climate change leaves no alternative. And the sooner we realize this, the better off we will be. What Washington must do in order to avoid the traps of petropolitics is to convert the U.S. into the world's first-ever green hegemon. For starters, the federal government must drastically increase investment in energy and environmental research and development (E&E R&D). This will require a serious sacrifice, committing upwards of $40 billion annually to E&E R&D - a far cry from the few billion dollars currently being spent. By promoting a new national project, the U.S. could develop new technologies that will assure it does not drown in a pool of oil. Some solutions are already well known, such as raising fuel standards for automobiles; improving public transportation networks; and expanding nuclear and wind power sources. Others, however, have not progressed much beyond the drawing board: batteries that can store massive amounts of solar (and possibly even wind) power; efficient and cost-effective photovoltaic cells, crop-fuels, and hydrogen-based fuels; and even fusion. Such innovations will not only provide alternatives to oil, they will also give the U.S. an edge in the global competition for hegemony. If the U.S. is able to produce technologies that allow modern, globalized societies to escape the oil trap, those nations will eventually have no choice but to adopt such technologies. And this will give the U.S. a tremendous economic boom, while simultaneously **providing it with** means of **leverage that can** be employed to **keep potential foes in check.**

### 2nc Uniqueness

#### Clean tech investment is coming now

Koch 11

Wendy, “U.S. clean tech companies get more venture capital,” USA Today, http://content.usatoday.com/communities/greenhouse/post/2011/11/us-solar-clean-tech-support-strong/1

Despite the recent bankruptcies of two federally backed energy companies, new reports suggest most Americans support the solar industry and venture capitalists are increasing their investments in U.S. clean tech companies. GOP members of Congress have criticized President Obama's Department of Energy for giving loan guarantees to dozens of clean energy companies, two of which -- solar panel manufacturer Solyndra and energy storage company Beacon Power Corp. -- have sought bankruptcy protection. FOLLOW: Green House on Twitter The clean energy sector is defending itself. It cites an Ernst & Young LLP analysis, released today, that says venture capital investments in U.S. clean tech companies jumped 73% to $1.1 billion in the third quarter of this year compared to the same time last year. On a consecutive quarter basis, dollars invested in the third quarter were 4% higher than the second-quarter amount. The energy storage sector **did best**, raising $421.0 million in the third quarter and posting a 1,932% increase over the same period last year. "Confidence in clean tech investing continues despite the challenging investment market. We saw significant commitments in energy storage, which reflects a growing corporate focus on proactively managing their energy mix," said Ernst & Young's Jay Spencer in announcing the findings.

#### Renewable energy continues to grow – fares better than other sectors during economic struggles

**Wood 11** (Lisa, “Post-Stimulus Financing: Will Renewable Growth Continue?”, http://www.renewableenergyworld.com/rea/news/article/2011/08/post-stimulus-financing-will-renewable-growth-continue)//AMV

LONDON -- Money is flowing worldwide for many forms of renewable energy, as the industry presses forward with dramatic growth. CleanEdge reported US$188.1 billion in global revenue for biofuels, solar and wind energy in 2010, a 35.2% surge over 2009. Bloomberg New Energy Finance (BNEF) found that clean energy investment worldwide reached $243 billion in 2010, nearly double the sector investment just four years earlier. And venture capital investment for clean technology in the US rose 54% in the first quarter of 2011 compared with the same period one year earlier, in a trend led by solar energy companies, according to Ernst & Young. What has buoyed the market? Many in the renewable energy sector thank stimulus funds infused into the industry by governments throughout the world. But will the growth continue as stimulus funding winds down? Will private lenders and investors pick up where government leaves off in a post-stimulus world? Several deal makers describe the state of today's finance markets and provide their outlook into 2012 and beyond, including how hard - or easy - it is to attract private tax equity, project finance, venture capital and other types of loans and investments. **Even as the world economy continues to struggle, renewable energy fares far better than many sectors.** REVIVAL OF U.S. TAX EQUITY? Jonathon Gross, a principal with US accounting firm Reznick Group and head of the firm's alternative energy practice in North Carolina, helps match renewable energy project developers with investors. He specialises in tax equity investments, where the investor, in effect, buys a project's tax benefits to offset tax liability. Goldman Sachs was one of the more notable tax equity investors before the financial collapse. But when profits dropped after the crash, so did tax liabilities. As a result, tax credits had little value and investors fled. In response, the US government created a cash grant to help renewable energy projects during this phase. The grant differed from a traditional tax credit in that developers received money up front, rather than after the project was built or operating. This helped renewable energy developers secure project financing when tax equity investors vanished. The grant, however, is being phased out beginning in 2012. Fortunately, tax investors are returning to the market, said Gross. But, he added, "I don't know if it will be fast enough for the developers who are getting the grant." Gross predicts a dip in US project development in early 2012 when the federal cash grant expires for projects that do not meet certain predevelopment requirements. Meanwhile, a player known as the tax equity syndicator is increasingly moving into energy. Syndicators, such as Stonehenge Capital Company and Red Stone, connect private equity investors with developers. They more commonly work in low-income housing investment, but syndicators lately have been attracted to state renewable energy credits, Gross said. Flat Water Wind Farm, a 60-MW Nebraska project, was a recent beneficiary of a tax equity deal. Completed in April 2011, the deal was arranged between U.S. Bancorp (USB), Gestamp Wind North America, Spanish Banco Santander and other lenders. USB has committed more than $400 million of renewable energy tax equity to finance over $800 million of renewable energy projects in the US, primarily in the solar and wind energy markets.

#### Clean tech coming now

Content 11

Thomas, Milwaukee Journal Sentinel, "Report finds Wisconsin 13th in clean-technology jobs," http://www.jsonline.com/business/125463128.html

Batteries, biofuels and water technology helped rank Wisconsin 13th among the 50 states in clean-tech jobs nationally last year, according to a new Brookings Institution-Battelle report. The report says about 2.7 million people nationally were employed by the "clean economy" last year, including nearly 77,000 in Wisconsin. "The clean economy is more than a myth," said one of the report's authors, Jonathan Rothwell, senior research analyst at Brookings. "And it's a **significant and growing area** of the U.S. economy, especially in the newer technologies such as solar, wind and biofuels, but also energy-efficiency related segments like the smart grid, electric vehicle technologies and fuel cells." The first report to look at the clean-tech economy in 100 cities across the country notes that Milwaukee has seen slower-than-average growth in clean technology in recent years, but it also highlights the region's efforts to expand in two clean-tech markets: water-efficiency technologies and batteries. The Milwaukee 7 regional economic development group has established a Water Council and advanced freshwater science research at the University of Wisconsin-Milwaukee. A similar initiative has been launched in energy storage, through the Wisconsin Energy Research Consortium and the announcement last week of a multimillion-dollar partnership between Johnson Controls Inc. and the state's two largest public universities. "We find that clustering is associated with faster growth in the clean economy from 2003 to 2010, so clusters in the Milwaukee area are apt to boost growth for the relevant companies and attract more companies that are doing similar work," Rothwell said. "Where innovation matters - and that's most industries, and not just the clean economy - clustering should matter." Madison, meanwhile, has seen above-average growth in clean-tech sectors, with particular strength in biofuels and energy-efficiency products and technologies, according to the report, prepared for a division of Brookings that focuses on the economies of the nation's metropolitan areas. Drivers of its green economy include companies such as renewable fuels developer Virent Energy Systems and the Great Lakes Bioenergy Research Center at UW-Madison. Researchers at Brookings used a database compiled by Battelle - the nonprofit organization that runs national energy research laboratories for the federal Department of Energy - to develop the report. It measures employment in a variety of fields, tallying up jobs linked to everything from renewable energy and pollution prevention devices to organic foods and green consumer products. The report recommends a variety of policy initiatives to help foster growth of clean-technology businesses but also says the private sector has moved swiftly to shepherd clean-tech's ascension. From 1995 to 2010, the value of venture capital flowing into clean-tech sectors rose from $1 billion to $4 billion. Clean-tech accounted for 17% of all venture capital dollars invested last year, Rothwell said.

#### Renewables now—reduced costs

Steffens 12President and CEO, Frankfurt School of Finance & Management (Uddo, June 2012, “Global Trends in Renewable Energy Investment 2012,” [http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2012)//DR](http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2012%29//DR). H

Reduced costs to deploy renewable energy foster the investment boom. They support and enable the transition towards a green economy. Others, often even technology-pioneering companies, suffer from increased competition in the sector. In fact, the present situation is characterised by painful disparities between the performances of different companies, and different countries, trying to benefit from the rapid transition towards renewable energies. The decline in costs of important renewable technologies is starting to challenge fossil-fuel alternatives, even without effective carbon prices or direct subsidies to the producer of renewable energy. Increasing competition has been accompanied by the bankruptcies of several significant solar manufacturers in the US and Germany in late 2011 and early 2012. Some actors have been leaving the stage of renewables, and new players are emerging. Nevertheless, the renewables sector shows all elements of a highly dynamic and vibrant industry - not only from an investment perspective. I am convinced it will offer exciting career opportunities for years to come. The new Global Trends Report provides us with the data and the reasons why.

#### Renewables shift now – going global

Brown 10Founder and president of Earth Policy Institute in Washington, D.C. (Lester Brown, August 25, 2010, “A global shift to renewable energy: But will it be fast enough?” [http://grist.org/article/a-global-shift-to-renewable-energy/)//DR](http://grist.org/article/a-global-shift-to-renewable-energy/%29//DR). H

**As fossil fuel prices rise, as oil insecurity deepens, and as concerns about climate change cast a shadow over the future of coal, a new energy economy is emerging. The old energy economy, fueled by oil, coal, and natural gas, is being replaced by one powered by wind, solar, and geothermal energy**. Despite the global economic crisis, **this energy transition is moving at a pace and on a scale that we could not have imagined even two years ago. And it is a worldwide phenomenon.** Consider **Texas**. Long **the leading** U.S. **oil-producing state,** it **is now also the leading generator of electricity from wind**, having overtaken California in 2006. Texas now has 9,700 megawatts of wind generating capacity online, 370 more in the construction stage, and a huge amount in the development stage. When all of these wind farms are completed, **Texas will have 53,000 megawatts of wind generating capacity — the equivalent of 53 coal-fired power plants. This will more than satisfy the residential needs of the state’s 25 million people, enabling Texas to export electricity, just as it has long exported oil.** Texas is not alone. **In South Dakota**, a wind-rich, sparsely populated state, **development has begun on a vast 5,050-megawatt wind farm** (1 megawatt of wind capacity supplies 300 U.S. homes) **that when completed will produce nearly five times as much electricity as the** 810,000 **people living in the state need.** Altogether, some 10 **states in the United States, most of them in the Greatt Plains, and several Canadian provinces are planning to export wind energy.** Across the Atlantic, the government of **Scotland is negotiating with two sovereign wealth funds in the Middle East to invest $7 billion in a grid in the North Sea off its eastern coast.** This grid will enable Scotland to develop nearly 60,000 megawatts of off-shore wind generating capacity, close to the 85,000 megawatts of current electrical generating capacity for the United Kingdom. **We are witnessing an embrace of renewable energy on a scale we’ve never seen for fossil fuels or nuclear power.** And not only in industrial countries. **Algeria**, which knows it will not be exporting oil forever, is **planning to build 6,000 megawatts of solar thermal generating capacity for export to Europe via undersea cable.** The Algerians note that they have enough harnessable solar energy in their vast desert to power the entire world economy. This is not a mathematical error. **A similarly remarkable fact is that the sunlight striking the earth in just one hour is enough to power the world economy for one year. Turkey**, which now has 41,000 megawatts of total electrical generating capacity, **issued a request for proposals in 2007 to build wind farms.** It received bids from both domestic and international wind development firms to build a staggering 78,000 megawatts of wind generating capacity. Having selected some 7,000 megawatts of the most promising proposals, **the government is now issuing construction permits.** In mid-2008, **Indonesia** — a country with 128 active volcanoes and therefore rich in geothermal energy — **announced that it would develop 6,900 megawatts of geothermal generating capacity, with Pertamina, the state oil company**, responsible for developing the lion’s share. **Indonesia’s oil production has been declining for the last decade**, and in each of the last five years the country has been an oil importer. **As Pertamina shifts resources from oil into the development of geothermal energy, it could become the first oil company** — state-owned or independent — **to make the transition from oil to renewable energy. These are only a few of the visionary initiatives to tap the earth’s renewable energy. The resources are vast. In the United States, three states** — North Dakota, Kansas, and Texas — **have enough harnessable wind energy to run the entire economy. In China, wind will likely become the dominant power source. Indonesia could one day get all its power from geothermal energy alone. Europe will be powered largely by wind farms in the North Sea and solar thermal power plants in the North African desert.**

#### Global investment in renewables is high now

Steiner 12 **–** UN Undersecretary General, UNEP Executive Director

Adam, June 2012, “Global Trends in Renewable Energy Investment 2012,” [http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2012)//DR](http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2012%29//DR). H

In 2011, global investment in the renewable energy sector hit another record, up 17% to $257 billion. This was a six fold increase on the 2004 figure and 93% higher than the total in 2007, the year before the world financial crisis. There may be multiple reasons driving this renewable investment, from strengthening regulatory frameworks to decreasing costs — whatever the drivers,. the strong and sustained growth of the sector is a major factor that is assisting many countries towards a transition to a low-carbon, resource efficient Green Economy This sends a strong signal of opportunity to world leaders and delegates meeting later this month at the Rio+20 Summit: namely that transforming sustainable development from patchy progress to a reality for seven billion people is achievable when existing technologies are combined with inspiring policies and decisive leadership. Furthermore, in 2011, renewable power (excluding large hydro) accounted for 44% of new generation capacity added worldwide in 2011, up from 34% in 2010. The $237 billion invested in building these green power plants compares with $223 billion of net new expenditure annually on building additional fossilfuelled power plants globally last year. So we’re certainly seeing a green growth trajectory in the power sector, even if we have quite some way to go to achieve an energy mix that is truly sustainable. With this goal in mind, in 2012 UN Secretary-General Ban Ki-moon is leading a global initiative called Sustainable Energy for All aimed at mobilising action in support of three interlinked objectives to be achieved by 2030: providing universal access to modern energy services; doubling the global rate of improvement in energy efficiency; and doubling the share of renewable energy in the global energy mix. Pushing forward on the energy agenda can assist in a defining and decisive outcome at Rio+20 including in support of the proposed Sustainable Development Goals that could be adopted in 2015. Other commitments on the table at the Summit can also assist the evolution of clean energy including governments agreeing to address the hundreds of billions of dollars worth of annual fossil-fuel subsides; expanding sustainability reporting by companies globally; and boosting sustainable procurement by central and local government. There are many areas where sustainable development is ready for a major acceleration and scaling-up—clean energy systems, by dint of their technology, the costs, the employment potential and the opportunities, are among the ripest at Rio+20.

#### The transition to renewable energies is speeding up globally

Steffens 12President and CEO, Frankfurt School of Finance & Management (Uddo, June 2012, “Global Trends in Renewable Energy Investment 2012,” [http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2012)//DR](http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2012%29//DR). H

The transition towards green - resource-efficient, low-emission - economies has picked up speed. New renewable technologies such as wind, photovoltaic and biofuels were introduced, developed and adopted. The capacity deployed was small and, although technologies were still expensive, overall investment levels were low. In 2011, investments in renewable energy have almost reached the level of investments in power generation based on fossil fuels. Globally, they have passed $250 billion per year, including large hydro. New business opportunities are arising and new jobs are being created. The contribution to GDP is considerable. Increasingly, clean energy is provided to industries and people around the globe.

### Uniqueness – US Leading

#### US is ahead

Hill 12(Joshua, “US Retakes #1 Spot in Clean Energy Investment in 2011”, http://cleantechnica.com/2012/04/12/us-clean-energy-investment-in-2011-number-1/)

 New research on clean energy financing in the Group of Twenty (G-20) nations released by The Pew Charitable Trusts shows that investment grew to a record $263 billion in 2011, a 6.5 percent increase over the previous year, with the United States beating out China in the race to secure private clean energy finances and investment. The U.S. attracted $48 billion in clean energy investment in 2011, a 42 percent increase over the previous year. As a result, the U.S. saw an addition of 6.7 gigawatts (GW) of wind and, for the first time, more than 1 GW of solar energy, enough to power 800,000 homes. By the end of the year, total U.S. installed renewable energy capacity topped 93 GW, second only to China, but this position will be difficult to hold with the expiry of Treasury grants and the Department of Energy’s loan guarantee programs. “In 2011, **the global clean energy sector grew again, the U.S. reclaimed its lead as the top destination for private investment, and consumers reaped the rewards of significantly reduced prices for clean energy technologies, such as solar panels, which are now nearly 50 percent cheaper than a year ago**,” said Phyllis Cuttino, director of Pew’s Clean Energy Program. “And yet, the yo-yo effect of U.S. clean energy policy hurts the ability of the United States to consistently compete and turn U.S.-led innovation into manufacturing, deployment, and export opportunities. Creative, stable, and transparent policies remain a critical signal to private investors.” Globally, the combination of falling clean energy technology prices coupled with growing investments saw an acceleration of clean energy generating capacity by a record 83.5 GW in 2011, bringing the global total to 565 GW. **Experts believe that with solar and wind technologies becoming more cost-competitive, renewable energy will become the preferred electric generating capacity for emerging economies.** 2011 saw G-20 investments in solar continue to rise, increasing 44 percent to $128 billion, making solar the leading technology for clean energy investment for the second year in a row. This increase offset a 15 percent decline in investments for both wind and energy efficiency in 2011. “The clean energy sector received its trillionth dollar of private investment just before the end of 2011, demonstrating significant growth over the past eight years,” said Michael Liebreich, CEO of Bloomberg New Energy Finance, Pew’s research partner. “Solar installations drove most of the activity last year as the falling price of photovoltaic modules, now 75 percent lower than three years ago, more than compensated for weakening clean energy support mechanisms in a number of parts of the world.” Overall clean energy investment continued to grow, with China attracting $45.5 billion, spurring the deployment of 20 GW of wind power, the most of any nation. Germany ranked third for the second year in a row among the G-20 members with $30.6 billion and 7.4 GW of solar power installed, while Italy attracted $28 billion and deployed a world record of nearly 8 GW of solar power. Source: Clean Technica (http://s.tt/19dg0)

### Uniqueness – Solar Specific Cards

#### Solar investment rising – falling polysilicon prices encourage

Fessler 12 (David, senior analyst for Investment U “Polysilicon Prices in 2012: The Tipping Point For Solar”, January 31st, 2012, http://www.investmentu.com/2012/January/polysilicon-green-energy.html)

Solar energy detractors point to the fact that it can’t compete without “huge” government subsidies. And up until now, I couldn’t argue to the contrary. But very soon, those detractors will likely be eating their words. I’ve said it many times in the past: Technology marches on, and the cost of manufacturing will come down. Well the cost of manufacturing solar isn’t just coming down; it’s dropping through the floor. **By the end of this year, solar will be so cheap it will compete with just about any other form of generation.** It already does in some places, and at commercial scale levels. The best part? It will do it without subsidies. You see, solar panel prices are about to cross a tipping point. It’s all due to the drop in price of a solar module’s most crucial ingredient: polysilicon. The Polysilicon House of Cards Polysilicon prices have collapsed 90% in the last five years. That translates directly into lower module costs, lower panel prices and ultimately into a lower installed cost per watt. How did this happen? Way back in 2006, there was a run on polysilicon. It turns out it’s the same material used to make integrated circuits. But all of a sudden, the solar industry was booming, and competing for what was then a limited supply. Its use for solar was rising rapidly, and 2006 was the first year that 50% of all polysilicon went into the manufacture of modules for solar panels. And panel manufacturers were clamoring for even more. Polysilicon makers were laughing all the way to the bank, and then some. They essentially were an oligopoly, and were earning upwards of 40% margins on their product, according to a recent research report published by GTM Research. Prices just kept rising along with demand, and by 2008 the shortage was so severe, polysilicon was selling for over $400 per kilogram on the spot market. Margins had risen to 70%. Naturally, this lured new players into the market, and led existing makers to expand manufacturing capacity. But they overestimated how much was really going to be needed. By 2011, much of this additional capacity began to come online, and polysilicon prices started falling. By March of 2011, the spot price had dropped to $80 per kilogram, and by this past December, it was all the way down to $30 per kilo. This incredibly low spot price was all the leverage customers with long-term contracts needed to renegotiate lower prices. GTM Research predicts that in 2012, these declining silicon prices will lead to even lower module prices. At the beginning of 2011, module prices were $1.80 per watt. By the end of 2011, they were halved to $0.90 per watt. Closing in on Grid Parity This year, GTM expects module prices to breach the $0.70-per-watt barrier and continue to head south. Of course, with other manufacturing costs and installation being relatively fixed, lower raw material means lower panel prices. And $0.70 per watt is below the magic $1.00-per-watt level that’s widely viewed as “grid parity” for solar. That’s the point where it makes just as much sense to use solar as any other form of generation. The system I installed at my farm is 10.08 kilowatts (KW). Over its 25-year lifetime, it’s expected to produce an average of 12,000 to 18,000 kilowatt-hours (kWh) per year. I’m leasing my system for five years, and will then purchase it. My total all-in cost is about $27,000. (Since I’m leasing the system, I don’t receive any government subsidies or tax breaks.) Let’s assume that the system produces the minimum amount per year, 12,000 kWh. Multiplying by 25 and then dividing by the cost of the system, we come up with $0.08 per kWh. My current electricity from the grid operator costs $0.14 per kWh. That’s almost a 50% savings. If I produce even more, my savings will be even higher. And this system has panels that were manufactured in 2011. Panels made this year will be even cheaper, and so will the all-in cost. Misinformation and Black Eyes So what’s keeping solar from being widely adopted? Lack of information, for one… The industry got quite a black eye over the Solyndra deal. GTM Research Senior Analyst, Brett Prior, believes the industry will continue to grow at 10% to 20% per year for the foreseeable future. He had this to say about the polysilicon market today: “After a half-decade of silicon demand outstripping supply, the aggressive expansion plans finally overshot. “This supply/demand imbalance will push producers to lower contract prices closer to the level of manufacturing costs at $20 per kilogram, and will force higher-cost manufacturers to exit the industry. “The end result is that the current roster of over 170 polysilicon manufacturers and startups will likely be winnowed down to a dozen survivors by the end of decade.” I believe that as prices continue to drop, solar will continue to gain in popularity. Big panel manufacturers like U.S.-based SunPower Corporation (Nasdaq: SPWR) will be around when the dust settles. They currently make the most efficient (19%) commercially available panels in the world. The stock is way off its highs of a year ago, but is up a healthy 22% since the beginning of the year. So is it solar boom time? I don’t have a crystal ball, but with module prices continuing to drop, it becomes more attractive every day. That’s good news for panel manufacturers, as they’ll continue to improve as volumes ramp up. Investors certainly won’t find them any cheaper than they are right now.

#### *Huge* advances in solar power are coming now

Lacey 11

Stephen, reporter/blogger for Climate Progress, where he writes on clean energy policy, technologies, and finance, “A Little Night Solar: BrightSource Energy Offers Multi-Hour Thermal Storage,” Climate Progress, http://thinkprogress.org/romm/2011/08/03/286519/a-little-night-solar-brightsource-energy-offers-multi-hour-thermal-storage/?utm\_source=feedburner&utm\_medium=feed&utm\_campaign=Feed%3A+climateprogress%2FlCrX+%28Climate+Progress%29

Yesterday, we highlighted an interesting concentrating solar power plant design from MIT that could significantly reduce costs and allow projects to **generate electricity 24-hours a day** using molten salt storage. Coincidentally, one of the leading CSP developers, BrightSource Energy, announced this morning that it will be offering molten salt storage for future power plant designs, allowing the company to **extend electricity production into the evening**. It’s not a 15-hour system like the Gemasolar plant in Spain – a project that became the first to generate ‘round the clock electricity. But the multi-hour system will help BrightSource lower the cost of electricity produced at a facility. BrightSource is developing a 392-MW Power Tower project in the Mojave Desert. The system does not feature molten salt storage, but future projects will presumably come equipped with the technology. While utilities deploy large amounts of solar PV, the CSP sector has been slow to flourish. That’s because PV plants are faster and often cheaper to build. However, large-scale CSP projects with storage provide more firm power that utilities can better rely on throughout the day – and often into the night. “That’s where these CSP technologies can have a real advantage,” says GTM Research Senior Analyst Brett Prior.

#### Will meet 100 percent of energy demands within 2 decades

Johnston 11 (John, “100% Solar Energy In 20 Yrs No Problem, Says Futurist Ray Kurzweil”, http://www.the9billion.com/2011/02/25/100-solar-energy-in-20-yrs-no-problem-says-futurist-ray-kurzweil/)

Futurist Ray Kurzweil has a prediction about the future of solar energy. He asserts that solar technology is improving at such a rate that it will soon be able to compete with fossil fuels. It will also be able to supply 100% of the world’s energy in about 20 years. Kurzwell has previously, and successfully, predicted that a computer would beat a human in chess by 1998, and that a worldwide communications network would emerge in the mid 1990s. Many of Kurzweil’s predictions are based on his law of accelerating returns, which maintains that technological change is exponential rather than linear, and that information technologies grow exponentially in capacity and power. This has been observed with computer processing power, which has doubled every 2 years for almost 50 years. Kurzweil believes this is also the case with solar technology. Solar power is doubling about every 2 years globally, and it has been doing this for the past 20 years. Today, solar energy is more expensive than using fossil fuels, but costs are declining fast**. We are only a few years away from solar being around the same cost as fossil fuels.** Kurzweil maintains that after that point, solar will continue to go down in price and will become more popular. He adds that currently solar power meets a very small percentage of the world’s energy needs, and people tend to dismiss technologies when they are only a very small fraction of the total solution. Crucially, he points out that if solar power doubles every 2 years, 8 more times, it will meet 100 percent of the world’s energy needs. Following that math, it will take 16 years, that’s 2027. He adds that the world will increase its energy needs during that time too, so we should add another couple of times to double on top of that. **So in about 20 years, around 2031, we will be meeting at least 100 percent of the world’s energy needs just with solar energy.** On the possible political obstacles involved, he says that as the cost per watt of solar falls significantly below coal and oil, people are going to change for economic reasons alone. It will cease to be a political issue.

#### Solar is strong now – survived the green bubble

Savitz 11

Eric, “Venture Capital: The Case For Investing In Solar,” http://www.forbes.com/sites/ericsavitz/2011/01/13/venture-capital-the-case-for-investing-in-solar/

Today, when you read about trends in venture capital investment, it would seem that you should have a funeral dirge playing in the background: investments are down 21% in software, 32% in biotech and 27% in medical devices. The hardest hit of all has been taken by an area that had been a VC darling just a few short years ago: the clean tech sector. Ernst & Young reported that VC funding for clean tech in the 2010 third quarter was down 55% from a year ago. Some investors are beginning to think that clean tech itself was a bubble, and that bubble has burst. But at Foundation Capital, we see this third quarter darkness as dawn, not dusk. And we see solar as one of the **brightest opportunities** still on the horizon. Specifically, we think that new models of financing have the opportunity to make residential solar – long the environmental community’s aspiration – a practical and profitable business reality. Here’s why. In the recent past, cleantech was dominated by large, capital-intensive projects. These blockbuster deals generated a lot of buzz, but have become a tough sell in the current economic and political climate. Case in point: California recently approved construction of a 370-megawatt solar thermal project in the middle of the Mojave Desert—the first such large-scale project in the U.S. in over twenty years. The plant will produce enough energy to power 725,000 homes. But to the chagrin of environmentalists, all that clean energy also threatens the habitat of an endangered desert tortoise. But what if there was a model that didn’t require displacing desert tortoises to bring solar power to the masses? A model that could save consumers 15 percent on their utility bills with an up-front investment of just $1,000 or less? Cost-competitive residential solar power is possible through a variation of a tried and true leasing business model and it’s called solar power service. Solar panels have been available for decades, but high up-front costs, complex technology and expensive maintenance have hurt solar’s appeal and discouraged widespread adoption. Today, several companies offer a new model of residential solar installation that finally overcomes all of these hurdles. It’s called a solar power purchase agreement (PPA), and it is essentially a sophisticated leasing arrangement. For a fixed monthly fee, homeowners can sign up for solar energy as a service from companies like Solar City, SunRun, or Sungevity. Under a solar PPA, the homeowner is freed from the $24,000 average installation cost, and the maintenance and converter replacement costs. Instead, it’s the provider who will manage the installation, monitor the panels to make sure they’re working efficiently, and repair them if they aren’t. The consumer then buys back the power produced on their roof at a fixed rate. These financing mechanisms make solar power as hassle-free as power from a traditional utility, with two notable exceptions; it’s cleaner and cheaper. Many utilities charge tiered rates—making consumers pay more per kilowatt-hour the more energy used. (In California, if you’re spending $500 a month with PG&E, some of your bill is likely in tiers three and four – meaning that you could be spending more than 30 cents more per kilowatt hour than you were with your first hour of usage. Given that Californians spend more than $5 billion a year for power just in tiers three through five, the potential savings for homeowners are huge.) With a solar PPA, consumers get the same low rate no matter how much power they use. And because solar PPA users generate a share of their own energy, it shrinks both their utility bill and their carbon footprint. This is a win/win for homeowners, and we think it’s a great bet for investors, especially following President Obama’s extension of the 1603 Tax Grant program as part of the larger tax agreement. This tax credit ensures that the solar power as a service model will continue to thrive. For the first time in history, residential solar is not just a viable choice, it’s the sensible one. Right now, when you fly into a typical American city, you see miles of black roofs (mostly tarpaper shingles, made with a byproduct from burning coal), flanked by green lawns. But to me and my colleagues, those black roofs look like a vast untapped market. That’s because the sun’s energy is keeping those lawns green, but when it hits the roofs, that energy gets absorbed as heat. This means a power plant has to burn more coal so a home’s air conditioner can compensate. Under the PPA solar service model, instead of giving money to the coal industry each month, consumers can put that solar energy to work and generate 75% of a home’s energy right from the rooftop. That’s why I believe that the **sun isn’t setting** on clean tech. It’s **just coming over the horizon**.

#### Solar venture capital funding is high now

Pleging 11

Steven, “Despite Solyndra’s Death, the future of Solar Energy is Sunny,” The Green Faction, http://www.thegreenfaction.com/2011/11/10/despite-solyndra%E2%80%99s-death-the-future-of-solar-energy-is-sunny/

I believe that the loss of industry players Solyndra, Evergreen, and SpectraWatt opens the market for more innovative solar companies to succeed with smarter tactics and mainstream products that fit into existing manufacturing models. Remember when the dot.com bubble burst in 2000 and, seemingly overnight, some companies ceased making millions hand-over-fist? Flash forward to 2011, when nearly everyone is online, Internet technology has become more accessible and fortunes continue to be made. Real innovation always finds its pot of gold. We’ve seen a considerable reduction in solar panel costs, but that is exactly why there is reason to be optimistic. Lower prices open markets that were previously barred economically. I believe most people fail to understand the solar sector. Unlike other established markets the solar industry is still a tiny fraction of the overall energy production worldwide. Solar’s competition is really fossil fuel, or in other words, the established way electricity is being generated. With subsidies long in place for nuclear, coal and gas in the U.S. along with the cheap cost of production for coal and natural gas, solar is essentially competing with that $0.10/kWh average cost of electricity in the United States and globally. It is not only wise we devote our resources toward solar technology; it is essential. We are already facing serious ramifications of fossil fuel emissions. Increases in carbon dioxide concentration along with global surface temperatures are showing a decline in agricultural yields due to climate change. , This along with melting glaciers and shifts in climate zones do not bode well for climate change stabilization without drastic efforts in greenhouse gas abatement. There are also the obvious human costs of other sources of energy, from water quality issues related to gas fracking and the loss of mountain tops and streams with coal mining to the shocking failure of the Fukushima Daichi nuclear power plant reactors in March of 2011 that has forced one hundred thousand Japanese in a twelve mile radius to evacuate. Yes, solar energy does need to arrive at end-user costs that are closer to fossil fuels, and concurrently, our research and development areas need to lead us beyond current solar PV technologies. The recent fall of Solyndra is a lesson in over-specialization but is not a damning of solar’s viability. The U.S. has 1,750 MW of PV planned for 2011 and currently employs 100,000 people, more than coal mining or steel manufacturing. Solyndra was producing a PV product that did not fit within traditional balance of system (BOS) solar industry structures. Their novel cylindrical solar modules which have a capacity to capture sunlight from 360º (if rooftops are painted white) and resist snow and dust, also required a shift in the industry as a whole in order to adopt them. Unfortunately, Solyndra’s timing was terrible, global poly-silicon supplies caught up with rising demand, going from a high of $500 per kilogram in 2008 to a mere $35 on spot markets today. Combined with a Chinese manufacturing boom, that lowered the overall cost of panels by 40 percent this year, Solyndra was unable to compete. On October 19th, seven solar PV manufacturers filed a federal trade dispute claiming China is dumping solar panels in the US below their own manufacturing cost, which likely in part, explains the 40 percent decrease in panels. Unfortunately, for Evergreen and Solyndra, that filing is too late. The United States spends almost $500 billion annually purchasing energy from other countries. About $4 billion of taxpayer money is allotted to nuclear, natural gas, and nuclear company subsidies, even when many geothermal sources are reaching or have reached, capacity. We need a better paradigm. New solar technologies can change this. The U.S. has vast regions that offer some of the sunniest places on earth, and you don’t need to live in the desert to harness solar power. New Jersey is second only to California in adoption of solar infrastructure. Despite the announcement recently that Germany will be lowering their feed-in tariffs in January of 2012, they remain 40% of the total solar market globally while receiving less average daily solar radiation than New Jersey . In the U.S., we are seeing a likelihood of long-term thin-film implementation when we develop the right technological fit. Within a few years, we expect at least a dozen markets will be economically viable without subsidies. Tariff reductions are occurring throughout Europe as the EU struggles with the Greek financial crisis. Despite this the solar market there has increased 65 percent as opposed to the 82 percent increase in 2010. While changes in policy are lowering European expectations slightly, the U.S. market is projected to increase by as much as 9 percent this year. The global solar market is expected to install 22 MW of electricity in 2011. Of course, the largest solar demands will be coming from China and India. From a purely economic standpoint, there will be no reason for China to remain with silicon when better alternatives become available. Solar PV installations in Asia grew by over 57% from 2006-2010, and 2010 showed an incredible 100% increase from 2009 and yet China still exports nearly 95% of their total PV production. However, China recently announced a national feed-in tariff program, increasing 2012 solar market projections. Many venture capitalists have established funds dedicated to launching green technology initiatives. First Solar, the largest thin-film manufacturer in the world, will see approximately $3.75 billion in revenue this year, and there are a number of solar companies emerging with very attractive growth opportunities precisely because there is so much room for improvement in terms of efficiencies and a reduction in materials costs. As with the dotcom crash, the death of Solyndra, Evergreen and others will usher in a more robust solar industry not signal the disappearance of PV as a viable alternative for future energy needs. Both companies were a tiny fraction of an enormous and rapidly growing global market. The egalitarian balance is one that will afford large-scale, global installation of solar energy panels at a price people can manage.

#### Solar investment high now

Godinez 9

Victor, “Solar energy startup companies raked in venture capital investments in 2008,” Dallas News, http://techblog.dallasnews.com/archives/2009/01/solar-energy-startup-companies.html

The venture capital industry is getting a bit skittish -- investments in startup companies fell eight percent from 2007 to $28.3 billion in 2008, the National Venture Capital Association reported over the weekend. But even with VC firms tightening their belts in the face of the recession, there is still one type of technology that is scoring big investment bucks: solar energy. So-called "clean tech" companies received 50 percent more venture money in 2008 than they did in 2007. And the list of 10 biggest venture investments of 2008 was dominated by solar startups (list after the jump). What's mean for all of us? Hopefully it eventually means cheaper energy that's not reliant on coal or some other petroleum product.

#### New breakthroughs are coming that solve 24/7

Lacey 11

Stephen, reporter/blogger for Climate Progress, where he writes on clean energy policy, technologies, and finance, “MIT Creating 24-Hour Solar Power on the Cheap?,” Climate Progress, http://thinkprogress.org/romm/2011/08/02/285708/solar-for-vampires-mit-team-creating-low-cost-247-solar-power/?utm\_source=feedburner&utm\_medium=feed&utm\_campaign=Feed%3A+climateprogress%2FlCrX+%28Climate+Progress%29

Researchers at MIT are designing a new method of building concentrating solar power plants with thermal storage that they say could lower the cost of energy by 50% compared with existing technologies. Last month, a 19.9 MW power-tower concentrating solar power plant in Spain became the first to generate electricity for 24 hours using molten-salt storage. But the cost of building that demonstration plant is higher than most CSP technologies – around $18 per watt, putting the cost of electricity somewhere around 30 U.S. cents per kilowatt-hour. The company developing the plant, Torresol, wasn’t building it to prove the design could be the cheapest. It was a demonstration plant to prove molten storage technology and allow the company to scale up a much larger plant. But it also showed that there’s still work to be done in order to bring down costs of concentrating solar power designs. MIT Mechanical Engineering Professor Alexander Slocum – along with a group of other researchers – says he’s designed a new type of tank for molten salt storage that could reduce equipment needs, increase durability and ultimately reduce the cost of electricity being generated by a plant. Rather than use a complicated plumbing infrastructure to heat and pump the molten salt for storage, Slocum’s design puts the salt storage and water heating in a single tank mounted on the ground, rather than on a tower far above the field of mirrors. Under the new design, the mirrors are actually mounted on a hillside above the storage tank and reflect sunlight down into a small opening in the top. The system could be “cheap, with a minimum number of parts,” says Slocum, the Pappalardo Professor of Mechanical Engineering at MIT and lead author of the paper. Reflecting the system’s 24/7 power capability, it is called CSPonD (for Concentrated Solar Power on Demand). The new system could also be more durable than existing CSP systems whose heat-absorbing receivers cool down at night or on cloudy days. “It’s the swings in temperature that cause [metal] fatigue and failure,” Slocum says. The traditional way to address temperature swings, he says: “You have to way oversize” the system’s components. “That adds cost and reduces efficiency.” As this technology is still in the research phase, the actual cost projections for such a plant can’t be precisely mapped. But the team says electricity could be as low as 7 cents per kilowatt-hour and as high as 33 cents per kilowatt-hour. Those cost ranges would be determined by many factors, including turbine capacity, size of the mirror field, quality of solar resources and a reduction in equipment needs. If the design works as the researchers suggest, it could hold a lot of potential. Because CSP plants have a higher cost per watt — and thus a higher cost of electricity — the use of storage like molten salt will be key to the success of the industry, GTM Research Senior Analyst Brett Prior tells Climate Progress: “If you want to make real progress with deploying these technologies, you need to have the same dispatchable characteristics as natural gas — you need firm power. Companies need to market their technology as something different than PV, which is a peaking resource, but can be more attractive on a cost basis right now. That’s where these CSP technologies can have a real advantage.” Prior says that Solar Reserve, a U.S.-based company developing power tower technology with molten salt storage in California and Nevada, has a projected cost of energy at 11 cents per kilowatt-hour. That’s just **below** what large-scale thin-film PV projects are producing today. So in theory, the MIT design could have major cost advantages if it works at scale. But as history shows, actually getting to that point isn’t easy. Many of the CSP designs that are being deployed on the demonstration and commercial scale have taken many years to get to this point. However, MIT’s Slocum says that the plant would be built using existing technologies — it would just require a new way of thinking about how to construct the project. Most of the individual elements of the proposed system — with the exception of mirror arrays positioned on hillsides — have been suggested or tested before, Slocum says. What this team has done is essentially an “assemblage and simplification of known elements,” Slocum says. “We did not have to invent any new physics, and we’re not using anything that’s not already proven” in other applications.

#### Solar is unique – innovations are fast and can be implemented immediately

-this card is about PV, not CSP

Lacey 11 - reporter for Climate Progress, where he writes on clean energy policy, technologies, and finance

Stephen, “Anatomy of a Solar PV System: How to Continue “Ferocious Cost Reductions” for Solar Electricity,” Climate Progress, http://thinkprogress.org/romm/2011/07/06/261550/solar-pv-system-cost-reductions/?utm\_source=feedburner&utm\_medium=feed&utm\_campaign=Feed%3A+climateprogress%2FlCrX+%28Climate+Progress%29

Solar PV is unique. Because manufacturing can scale so quickly and the technology can be deployed so rapidly on existing infrastructure, the rate of innovation in PV is arguably faster than in any other energy sector. The digital age has made us accustomed to constant change, which is probably one reason people get so impatient with the seemingly slow pace of change in the energy sector. The rate of change in PV most closely resembles what we see in the IT sector, which makes it a very compelling story. And it’s not just journalists who are giving PV so much attention – it’s playing out in the business world as well. In 2011 alone, four major U.S. projects totaling 1,850 MW of capacity have switched from CSP to PV because the economics of PV have changed so drastically while the economics of CSP have changed more slowly. A recent Reuters story on the trend had some very telling quotes: “**The pace is quickening**,” GTM Research analyst Brett Prior said of the numbers of projects making the switch to PV. “You can build a PV project all-in and it will cost less upfront and cost less ongoing. You will make more money on that project, and so it just makes sense to switch it.” “PV is **available now and financeable now**,” said Sean Gallagher, managing director of government and regulatory affairs for K Road Power. “The production of SunCatcher technology has been delayed for a couple of years. It can’t be deployed as soon as PV can be deployed.” “Our CSP is a little bit more restrictive,” [Edward Sullivan of Solar Millennium] said. “We have to develop 250MW chunks, so that requires us to develop large continuous swaths, whereas PV is much more flexible.” What is driving these changes? There is a lot of fascinating research and pre-commercial activity happening around plastic solar cells, inks, fibers and other materials. But the most exciting innovations are coming from businesses finding new ways to manufacture, finance, package, sell and install solar – all with today’s commercially-available technologies.

#### Non-intermittence has been demonstrated

Lacey 11 - reporter for Climate Progress, where he writes on clean energy policy, technologies, and finance

Stephen, “Solar Can Be Baseload: Spanish CSP Plant with Storage Produces Electricity for 24 Hours Straight,” Climate Progress, http://thinkprogress.org/romm/2011/07/05/260438/solar-can-be-baseload-spanish-csp-plant-with-storage-produces-electricity-for-24-hours-straight/?utm\_source=feedburner&utm\_medium=feed&utm\_campaign=Feed%3A+climateprogress%2FlCrX+%28Climate+Progress%29

While Americans celebrated U.S. history on the Fourth of July yesterday, a company in Spain celebrated an historic moment for the solar industry: Torresol’s 19.9 MW concentrating solar power plant became the first ever to generate uninterrupted electricity for 24 hours straight. The plant uses a Power Tower design which features a field of 2,650 mirrors that concentrate sunlight onto a boiler in a central receiver tower. The plant also utilizes molten salt as a heat-transfer fluid that allows the plant to generate electricity when there’s no sunlight. Recharge News reported on the milestone: After commissioning in May, the plant was finally ready to operate at full-blast in late June and benefited from a particularly sunny stretch of weather, according to Diego Ramirez, director of production at Torresol. “The high performance of the installations coincided with several days of excellent solar radiation, which made it possible for the hot-salt storage tank to reach full capacity,” Ramirez explains.

#### CSP key

Romm 8

Joseph, senior fellow at the Center for American Progress, where he oversees ClimateProgress.org., “The technology that will save humanity”, April 14, 2008, http://www.salon.com/2008/04/14/solar\_electric\_thermal/singleton/

Certainly we will need many different technologies to stop global warming. They include electric cars and plug-in hybrids, wind turbines and solar photovoltaics, which use sunlight to make electricity from solid-state materials like silicon semiconductors. Yet after speaking with energy experts and seeing countless presentations on all forms of clean power, I believe the **one technology** closest to being a **silver bullet** for global warming is the other solar power: solar thermal electric, which concentrates the sun’s rays to heat a fluid that drives an electric generator. It is the best source of clean energy to replace coal and sustain economic development. I bet that it will deliver more power every year this century than coal with carbon capture and storage — for much less money and with far less environmental damage. Clearly, the world needs a massive amount of carbon-free electricity by 2050 to stabilize greenhouse gas emissions. The industrialized countries need to cut their carbon dioxide emissions from electricity generation by more than 80 percent in four decades. Developing countries need to find a way to raise living standards without increasing electricity emissions in the short term, and then reduce those emissions sharply. And, over the next few decades, the world needs to switch to a ground transportation system whose primary fuel is clean electricity. This electricity must meet a number of important criteria. It must be affordable: New electricity generation should cost at most about 10 cents per kilowatt hour, a price that would probably beat nuclear power and would certainly beat coal with carbon capture and storage, if the latter even proves practical on a large scale. The electricity cannot be intermittent and hard to store, as is energy from wind power and solar photovoltaics. We need power that either stays constant day and night or, even better, matches electricity demand, which typically rises in the morning, peaks in the late afternoon, and lasts late into the evening. This carbon-free electricity must provide thousands of gigawatts of power and make use of a low-cost fuel that has huge reserves accessible to both industrialized and developing countries. It should not make use of much freshwater or arable land, which are likely to be scarce in a climate-changed world with 3 billion more people. Solar electric thermal, also known as concentrated solar power (CSP), **meets all these criteria**. A technology that has the beauty of simplicity, it has proved effective for generations. As the Web site of CSP company Ausra illustrates, solar thermal has a long and fascinating history.

#### Only CSP solves

Romm 8 (Joseph, senior fellow at the Center for American Progress, oversees ClimateProgress.org, author of “Hell and High Water: Global Warming – The Solution and the Politics”, served as acting assistant secretary of energy for energy efficiency and renewable energy in 1997, holds a Ph.D. in physics from MIT, “The technology that will save humanity”, http://www.salon.com/2008/04/14/solar\_electric\_thermal/)//AMV

One of oldest forms of energy used by humans — sunlight concentrated by mirrors — is poised to make an astonishing comeback. I believe it will be the most important form of carbon-free power in the 21st century. That’s because **it’s the** only formof clean electricity that can meet all the demanding requirements of this century. Certainly we will need many different technologies to stop global warming. They include electric cars and plug-in hybrids, wind turbines and solar photovoltaics, which use sunlight to make electricity from solid-state materials like silicon semiconductors. Yet after speaking with energy experts and seeing countless presentations on all forms of clean power, I believe the one technology closest to being a silver bullet for global warming is the other solar power: solar thermal electric, which concentrates the sun’s rays to heat a fluid that drives an electric generator. It is thebest sourceof clean energy to replace coal and sustain economic development. I bet that it will deliver more power every year this century than coal with carbon capture and storage — for much less money and with far less environmental damage.

#### Specifically, investment in concentrated solar power increasing – falling costs and steep technological developments

Stancich 12 (Rikki, reporter for CSPToday, “Ventizz: Concentrated solar power poised for PV-style growth”, http://social.csptoday.com/technology/ventizz-concentrated-solar-power-poised-pv-style-growth)

Dr. Helmut Vorndran, Ventizz Capital Partners’ General Partner, comments on the private equity fund’s recent investment into Rioglass, and on the concentrated solar power sector’s burgeoning investment potential. Interview by Rikki Stancich in Paris Ventizz Capital Fund recently announced its investment into Rioglass Solar, one of the leading manufacturers of solar reflectors for concentrating solar power (CSP) plants. CSP Today contacts Ventizz Capital Partners to learn more about the deal and whether the private equity fund will seek out futher investment opportunities in the concentrated solar power sector. CSP Today: The Rioglass investment in December marks Ventizz' first foray into the concentrated solar power (CSP) sector. Why did Ventizz opt to invest in a glass reflector manufacturer? Dr. Helmut Vorndran: The mirror itself is a critical component for ensuring the efficiency and reliability of utility scale power production. Rioglass is the world market leader for these mirrors among just a few companies that are able to provide such hiqh-quality and bankable components. At the end of the day the cost competitiveness of CSP plants depend, among other things, on the quality of the mirror. As such Rioglass Solar, as a technology driven company with a clear USP, propriety know-how and the position as the world market leader, is a typical investment case for Ventizz and fits very well into Ventizz´ investment profile. CSP Today: Did you consider any alternative reflector technologies (i.e. shatterproof, lightweight polymer or aluminium alternatives)? If not, why? Dr. Helmut Vorndran: We clearly consider Rioglass Solar as a platform investment from which we drive further activities in the CSP mirror sector. We have carefully analysed other reflector technologies than glass, but if you consider the lifetime such components and the requirements need to become bankable, we concluded that Rioglass Solar is using the right technology. In addition, with its strong R&D capacities, Rioglass offers tremendous opportunities to further increase the efficiency of the reflector and drive down the cost of the overall reflector system that go far beyond its world leading mirror technology. Thus we are able not only to quickly capture future technology trends in CSP but also to set trends on our own. CSP Today: What growth potential does Ventizz predict in the CSP reflector space? Dr. Helmut Vorndran: We believe that the market for CSP is still in its infancy and will grow from the 1GW additional capacity per annum as of today, to 2-3GW and beyond in the coming years. But this will very much depend on first, the ability to further reduce the cost of the technology and second the financing environment for such large CSP projects. Once the new CSP projects in the US are on the grid and the many projects in the emerging markets like India, Morocco and South Africa have been successfully implemented, we will have new reference points for the CSP technology which will help to set the benchmark for cost and quality of the power delivered to the grid. At this point we expect the market to accelerate significantly. Specifically the reflector market we will see a broader spectrum of CSP technologies and therefore reflector solutions, which will require flexible production technologies and local production sights. CSP Today: Is Ventizz considering any other investments in this sector? Dr. Helmut Vorndran: In our view the renewable energy assets basket of the currently investing Ventizz Capital Fund IV L.P. represents the best diversified cleantech portfolio in Europe. We constantly monitor developments in all renewable energy markets in general and seek to diversify our renewable energy portfolio even further. Of course we are also looking at expanding our CSP-engagement. CSP Today: Ventizz is among a growing number of PE investors who are entering the renewable energy space. What key factors instilled the confidence in Ventizz to invest in relatively new technologies like CSP? Dr. Helmut Vorndran: We are expecting a similar growth in CSP to the one we have seen in the PV market. Both markets are driven significantly by steep technological learning curves and the subsequent falling costs. This correlates strongly with our philosophy: Ventizz is all about looking for the technological edge and how to translate this into sustainable and profitable growth.

#### More evidence

Wolf 10 – leading environmental writer on global warming and other natural issues

2010, Vicki Wolf, “Advances in Energy Technology Promise More Than Global Warming Solutions” http://www.cleanhouston.org/energy/features/tech\_promise.htm

Advances and breakthroughs in technology this year range from energy efficiency with plug-in electric cars to improving ways to tap into energy from the wind and sun. Most of these technological advances promise ways to reduce dependence on fossil fuel, reduce global warming gasses, stimulate the economy and create jobs. Implementing these technologies also will mean better air quality. As large cities and businesses begin to use these technologies, the prices will come down for everyone. Most experts agree we will need a broad array of technologies to stop global warming. Joe Romm, climatologist, author and host of the *Climate Progress Blog*, lists solar photovoltaics, wind turbines and plug-in hybrids. After researching clean energy technology he says, “The one technology closest to being a silver bullet for global warming is the other solar power.” He’s talking about Concentrated Solar Power (CSP), which concentrates the sun’s rays to heat a liquid that drives an electric generator. The key is cheap storage, according to Romm. “The easiest way to deal with the intermittency of the sun is cheap storage — and thermal storage is much cheaper and has a much higher round-trip efficiency than electric storage.” Romm says CSP has the ability to provide power reliably through the day to key locations around the world. He believes CSP is essential in what he calls “the **full global warming solution**.” As new technology becomes available, governments and businesses will need to decide on the best investments to meet energy demand. Dr. Robert Harriss, president of HARC (Houston Advanced Research Center) says energy efficiency is first on the list. “Technology that offers the best climate change solutions are those that contribute to a more resilient energy supply at the lowest cost. “Everyone agrees that energy efficiency is the most effective investment,” Harriss says.

### Electric Cars Specific Cards

#### VC high in *electric cars* now

CNBC 11-11

“Green Energy Has Clear Winners And Losers In 2011,” http://www.cnbc.com/id/44716931

New investment is key in this diverse, capital-intensive sector, and despite a somewhat sluggish global economy, venture capital is finding plenty of opportunity in clean tech. The year 2010 was a record, with $7.8 billion invested globally, according to the closely followed data of Cleantech Group. More recently, some $2.23 billion was invested across 189 deals in the third quarter. That's 12 percent more than the previous quarter. What's more, 59 percent of those deals involved second or later rounds of financing, an indication that the companies involved were living up to expectations. The sector's dynamism, however, may be best reflected in the gravitation of investment capital. For the first time, energy storage received the most venture capital ($514 million), displacing solar ($350 million). Solar also lost the No. 1 spot in deal volume. Energy efficiency was the most popular area, with 34 funding rounds. Energy storage (e.g. batteries) — considered something of a silver bullet — still presents sizable technological hurdles, while efficiency is now clearly the low-cost, plain vanilla version of clean tech. This rotation of sorts is commonplace in maturing industries. Still, to mark our annual November "Green Is Universal" Week , we decided to take a broader view — wrapping in other developments in the alternative energy sector this year — to create our "Winners & Losers" special report. By no coincidence energy efficiency and storage, specifically **electric cars**, along with the booming recycling business, are our three winners.

#### That solves oil

The Guardian 11

“Mike Granoff, head of oil independence policies, Better Place,” http://www.guardian.co.uk/activate/mike-granoff-electric-cars-oil-independence

Electric cars are the **key to oil independence**, and they're about to go mainstream, says Mike Granoff In 30 words or less tell us who you work for and what you do: I head oil independence policies for Better Place, helping industry and government align to accelerate the transition of transport to all-electric. Do you have a website / blog? www.betterplace.com Website you can't live without? www.jpost.com What is the purpose behind Better Place and the work you do there? What are your aims? To end oil. A model to make a car that doesn't use oil cheaper and more convenient than one that does, and the market will do the rest. How long do you think the U.S. can sustain dependence on oil? Isn't the crux of the issue the fact that there is not an obvious and scalable alternative? On the contrary, electric cars are the scalable alternative – and will inevitably replace gasoline cars. The only question is whether the U.S. chooses to be proactive and lead, or whether we wait for Europe (with higher gas prices) and China (with central planning) to enjoy the benefits of oil-free economies first. Battery separation model makes the consumer economics work here and now. How have the events in Fukishima affected the possibility of a broader energy mix in the U.S. and many other countries? Is nuclear off the agenda now? It is out of my domain expertise, but I imagine it makes it much harder for a nuclear renaissance. At the same time, less than a year after the Gulf spill, we are back to permitting offshore drilling – so don't be too sure of anything. Is innovation the key to adopting energy alternatives or is policy the reason for this? What is preventing oil independence? Innovation will only occur where there is deployment. Don't put 100 million smartphones out there and you won't see an "App" business. The key is really not technical innovation as much as business model innovation. When news goes from paper to electrons, you can't just try to make the old business model work. Same goes when cars go from gasoline to electrons. How far are you from achieving your aims at Better Place? Less than a decade. By the end of this year, consumers will be buying cars supported by our networks in Israel and Denmark. Within a handful more, I would not want to have to try to sell a gasoline car in either of those markets. And if we are right, it won't take long for the model to proliferate – sometimes by us, sometimes by others – around the world. And what can we expect from you at the Activate Summit in New York? President Obama said we've been having the "get-off-oil" conversation for 40 years. He's right. But he still hasn't offered a plan. I'll tell you the plan. If you look at where the oil really goes, and you don't conflate this with the whole host of other energy issues, than that old canard "no silver bullet" just doesn't apply. Most oil goes to cars. All cars can go electric. **That's the silver bullet**.

#### Solves economy, oil and dependence

Mincer 11

Shifra, “Electrifying Transportation,” http://energy.aol.com/2011/05/27/electrifying-transportation/

Electric vehicles (EV) may be the silver bullet. EV's, a technology that could recharge the US economy, reduce its dependence on foreign imported oil, create domestic jobs, cut polluting carbon emissions, and eliminate noise pollution from traffic, were the topic of discussion last week at the US Senate Committee Hearing on Energy & Natural Resources. "Electric vehicles have **great potential** and we want to see them transform the industry," said Senator Lisa Murkowski (R-AK), ranking member of the committee, in her opening remarks. On the table were two recent bill proposals, S.948, The Promoting Electric Vehicles Act of 2011 and S. 734, The Advanced Vehicle Technology Act of 2011. The first bill, proposed by Senators Jeff Merkley (D-OR) and Lamar Alexander (R-TN), would provide $300 million in grants over 5 years for the deployment of electric vehicles in certain communities, a program called the "National Plug-in Electric Drive Vehicle Deployment Program." Its aim is to select 30 pilot communities that would each receive $10 million in grants for EV infrastructure that would be built simultaneously to EV deployment, thereby solving the common chicken-egg problem of new technology implementation. It would also allow for, with EV technology being tested on a large scale, the country to learn best practices of EV use and to move ahead with national-scale deployment in subsequent years. The Advanced Vehicle Technology Act, proposed by Senator Debbie Stabenow (D-MI), would provide government incentives to convert medium and heavy-duty vehicles, such as trucks and tractor-trailers, into hybrids and EV's. In proposing the bill Stabenow also seeks to promote domestic battery manufacturing, an already booming industry in Michigan. "If we can take these technologies and move them to large vehicles, we are doing even more," she said at the hearing. Chair of the committee Senator Jeff Bingaman (D-NM) also encouraged large-scale federal deployment, noting that electric garbage trucks would be an interesting place to start. Murkowski joked that if this would make her garbage truck silent, she would jump on such a measure. Although EV's also require vasts amount of power, the five expert witnesses that testified at the hearing emphasized that electricity was a more domestic resource than oil and could be derived from a wide range of sources, including renewable generation sources.

#### On the brink – solves warming

Business Wire 10

“Plug-in Electric Cars Can Lower Global Warming Emissions, Oil Consumption and Unhealthy Air Pollution,” http://www.businesswire.com/news/home/20100120006249/en/Plug-in-Electric-Cars-Global-Warming-Emissions-Oil

Increasing America’s use of plug-in electric and plug in hybrid cars would **dramatically reduce** emissions that cause global warming and air pollution and would curb our dependence on oil, according to a new white paper released today by Environment Texas. “America’s current fleet of gasoline-powered cars and trucks leaves us dependent on oil, contributes to air pollution problems that threaten our health and produces large amounts of **global warming** pollution,” said Texas State Representative Rafael Anchia. A “plug-in” car is one that can be recharged from the electric grid. Some plug-in cars run on electricity alone, while others are paired with small gasoline engines to create plug-in hybrids. Many plug-in hybrids can get over 100 miles per gallon, while plug-in electric vehicles consume no gasoline at all. Plug-in vehicles produce no direct tailpipe pollution when operating on electricity and there is already a vast electric power infrastructure to fuel them. As renewable energy sources, like wind and solar, meet a larger share of our electricity needs, electric car could contribute to **little or no air pollution**. Utilities and retailers are gearing up for plug-in vehicles so they will be ready to provide the necessary services to their customers when cars start arriving later this year. "We're **on the cusp of an historic shift** in the way we use energy for transportation," said Jim Burke, CEO, TXU Energy. "Increasing the use of electric vehicles is vitally important for Texas, for our community, and for our customers - so it's vitally important to us as well. We are working to help lead this shift, including developing time-of-use rates that will help our customers benefit from cheaper night time charging."

#### Focusing on the grid *alone* doesn’t solve oil or warming

Cal Cars 11

“All About Plug-In Hybrids (PHEVs),” http://www.calcars.org/vehicles.html

The nationwide electrical grid is only **3%** petroleum-fueled, whereas transportation is almost completely powered by oil -- **60%** of which comes from foreign sources (and growing). Adoption of plug-in hybrids will transfer the overwhelming majority of our miles driven to nearly oil-free electricity. If all vehicles were plug-in hybrids we would cut our oil needs by 55%, nearly enough to eliminate foreign sources altogether.

#### Arguments that electric cars increase emissions are wrong

Murray 9 (James, “Electric car industry hits back at emission report”, 12 Nov. 2009, http://www.businessgreen.com/bg/news/1800787/electric-car-industry-hits-emission-report)//AMV

The electric car industry has hit back at a new study suggesting "electric cars could speed climate change", arguing that **the study understates the environmental benefits associated with electric vehicles and could undermine the embryonic market**. The report from the Environmental Transport Association (ETA) warns that the reliance on grid electricity to power electric vehicles means that electric cars have emissions of 106 grams of CO2 per kilometre - significantly less than average petrol car emissions of 172g/km, but more than low-emission vehicles such as the Toyota Prius, which has official emissions of 89g/km. It also argues that a loophole in EU vehicle emissions legislation means that the development of electric cars could inadvertently lead to increased overall emissions from the transport sector in the short term. Under the legislation, which was introduced late last year, electric cars are rated as zero carbon for the purposes of firms complying with the goal of ensuring average new car emissions are under 130g/km by 2012. Moreover, car firms producing electric cars receive so-called "super credits" that allow them to produce 3.5 SUVs for each electric vehicle they produce. "The combined effect of these loopholes would be that car makers that choose to market electric cars to meet EU targets would have to do less to reduce emissions of conventional cars," the report states. "The overall effect would be higher CO2 emissions and oil use." ETA director, Andrew Davis, said that the report was "not intended to dampen enthusiasm for electric vehicles". But he argued that "their introduction should not be viewed as a panacea; significant changes to the way we produce and tax power are needed before we will reap benefits". However, the report quickly prompted headlines labelling electric cars as " dirty" and accusing them of harming the climate, resulting in an angry response from industry insiders who accused the study of failing to account for the long-term environmental benefits and lower "wheel-to-well" carbon emissions associated with electric vehicles. "**We have to keep going back to the basic message that electric cars are cleaner,**" said Barry Shrier, chief executive of Liberty Electric Cars. "Study after study has shown that the wheel-to-well emissions are much better – even if you produce electricity in the dirtiest way available using coal, life cycle emissions from electric vehicles are still 50 per cent lower than they are for internal combustion engines." He added that electric vehicles also had the potential for their emissions to fall to **nearly zero** as electricity supplies are decarbonised. "Piston engine technologies will never be zero carbon," he said. "They are a dead end." His comments were echoed by a spokesman for the Department of Transport who said that large numbers of electric cars could be supported as the grid infrastructure is improved. "**Electric cars powered from today's UK generating grid would save up to 40 per cent of the CO2 emissions of a conventional petrol car over its full life cycle,"** he said. "This saving can improve as the grid moves to using more low-carbon power sources. If demand for electricity is properly managed, through the use of smart meters and dynamic tariffs, the grid can support a relatively high number of **Electric Vehicles**. In fact, they **can provide a way to capture and store electricity at night from renewable sources like wind power.**" **The concerns over the EU "loophole" are also largely unfounded**, according to Shrier, who said that it represented an effective means of incentivising large auto manufacturers to transition to electric vehicles. "No one is expecting big companies to move overnight to only producing electric cars," he said. "But the way the super credits are structured gives them an incentive to start producing electric cars and they can then expand from there." In related news, India-based electric car giant Reva, the company that supplies the popular G-Wiz in the UK, has inked a major deal with an Icelandic renewable energy firm to develop recharging infrastructure in the country. Under the agreement, Northern Lights Energy (NLE) will have exclusive rights to distribute Reva's new NXR model and any consequent models. It will also work to develop a recharging infrastructure system and vehicle exchange service for the island in an attempt to support the wider adoption of electric vehicles. NLE chairman, Gisli Gislason, said that Iceland had the potential to become a pioneering market for low-carbon vehicles. "Iceland is an island and with its advanced electric grid technology using 100 per cent renewable energy in electricity production is a perfect location for zero emission electric vehicles," he said, adding that in addition to selling electric vehicles the company was also working on a project to convert existing internal combustion engine cars into electric cars.

#### Electric cars substantially cut back carbon emissions

Georgia Institute of Technology 9 (February 11, 2009, “Reducing Carbon Dioxide Through Technology and Smart Growth, ScienceDaily, <http://www.sciencedaily.com/releases/2009/02/090211161854.htm>)

According to Brian Stone, associate professor of City and Regional Planning, the research shows that expected levels of CO2 emissions from cars and trucks in 2050 could be reduced back to 2000 levels if the full vehicle fleet was converted to hybrid electric vehicles, such as the Toyota Prius or the soon-to-be released Chevy Volt. This research also found that a doubling of population density in large U.S. cities by 2050 would have a greater impact on CO2 reductions than full hybridization of the vehicle fleet. Stone’s study looked at 11 major metropolitan regions of the Midwestern U.S. over a 50-year period and took into account three different scenarios: the use of hybrid vehicles and two different urban growth scenarios through which population density was increased over time, a central component of smart growth planning. “In this study we looked at two general approaches on how to deal with the challenge of climate change,” said Stone. “One approach is to improve vehicle technology and become more efficient. We can use less gas and reduce tailpipe emissions of CO2. The second approach is to change behavior by changing the way we design cities. We can travel less and take more walking and transit trips.” **Stone says he believes it would be possible for virtually all cars on the roads by 2050 to be hybrid electric vehicles,** assuming the costs of these vehicles become more competitive with conventional engine technologies. Today’s hybrid electric vehicles can achieve 40 miles to the gallon and higher. However, even the full hybridization of the national vehicle fleet by 2050 would not meet the CO2 targets identified though the Kyoto Protocol, an international climate change agreement which the United States has signed but not yet ratified. To meet these global targets, CO2 emissions from all sectors on the U.S. would need to return to 1990 levels or lower. According to Stone’s work, meeting this goal in the transportation sector would require a combination of technological improvements and higher density land use patterns in cities. “If we can help cities to grow in more compact ways, what we call smart growth, it will help reduce emissions even further by allowing people to travel less often, travel shorter distances when they do travel and take advantage of public transit,” said Stone. The eleven metropolitan regions that were studied include Madison, Wisconsin, Columbus, Ohio, Indianapolis, Indiana, Minneapolis-St. Paul, Minnesota, Cincinnati, Ohio, Grand Rapids, Michigan, Chicago, Illinois, Detroit, Michigan and Dayton, OH. In addition to Stone, Dr. Tracey Holloway, Scot Spak, and Adam Mednick also authored the study.

#### Electric vehicles key – best way to cut back emissions

Haluzan 10 (Ned, “Electric cars – Solution to reduce CO2 emissions?”, September 28, 2010, [http://sciencefactsandarticles.blogspot.com/2010/09/electric-cars-solution-to-reduce-co2.html)//AMV](http://sciencefactsandarticles.blogspot.com/2010/09/electric-cars-solution-to-reduce-co2.html%29//AMV)

If world wants to avoid the worst of climate change then our global emissions will have to significantly decline in years to come. Many believe that the easiest way to achieve this would be if we would to replace fossil fuels with renewable energy sources. In light of this, there was this one very interesting research conducted by Rice University's Baker Institute for Public Policy. The main conclusion of this research is that **electric cars look like better solution for reducing emissions and lowering U.S. oil imports than a national renewable portfolio standard**. According to this study "the single most effective way to reduce U.S. oil demand and foreign imports would be an aggressive campaign to launch electric vehicles into the automotive fleet." The researchers have calculated that mandating that 30 percent of all vehicles be electric by 2050 would not only reduce U.S. oil use by 2.5 million barrels a day beyond the 3 million barrels-per-day savings already expected from new corporate average fuel efficiency standards, but also cut emissions by 7 percent, while the proposed national renewable portfolio standard (RPS) would cut them by only 4 percent over the same time. The researchers also concluded that "business-as-usual market-related trends might propel the United States toward greater oil and natural gas self-sufficiency over the next 20 years while scenarios specifically focused on strict carbon caps and pricing or a high carbon tax of $60 a tonne or more could lead to a significant increase in U.S. reliance on oil imports between now and 2025. A carbon tax of $30 a tonne would also increase U.S. dependence on imports of foreign liquefied natural gas (LNG) by 2025." **If electric cars could really be of great help to reduce carbon emissions then the good news is that electric cars industry has started to grow in United States,** with many new facilities opening across the US territory.

### Uniqueness – AT: Bankruptcies

#### Despite bankruptcies, investment in clean tech is stable

Connolly 11

James, “VC: Despite Solyndra, cleantech still kind to investors,” http://www.bizjournals.com/boston/news/2011/11/01/vc-defends-cleantech-investing.html

Despite the spectacular crashes of some cleantech companies, the performance of venture capital investments in that sector has actually been on a par with the performance of investments in companies across the broader spectrum of industries, according to Venrock vice president Matthew Nordan. Nordan presented the keynote address at the Conference on Clean Energy 2011 at the Westin Boston Waterfront this morning, saying that one analysis of cleantech companies and general VC investments showed that roughly 40 percent of funds investing in cleantech were “above water”, which ranged over a three year period from “a little worse” to “a little better” in comparison with the general VC investments. Nordan, focusing his presentation to about 100 entrepreneurs and investors on trends in clean energy investing, also noted that looking at the investments that going into developing a particular technology can be deceptive. He said that once that technology is deployed and produces revenue over a period of many years the value can be many times higher than the original investment in the core technology. Looking at companies that have been funded and are ready to move into the later stages of development, such as Series C Rounds, Nordan said, “There will be unprecedented late stage requirements.” He said projections are that late stage cleantech investment will require $4.5 billion for each of the three years between 2012 and 2014. But he added that entrepreneurs that reach that stage shouldn’t worry about a shortfall. “VCs are already out raising money for that,” he said, “Growth capital will be out there with people raising money in gigantic pools.”

#### Renewable investment surging – slight upsets similar to “growing pains” in the early automobile industry

Baker 12 (Nathanael, “Renewable Energy Investments Grow to Record $253 Billion in 2011”, June 12, 2012 http://www.energyboom.com/finance/renewable-energy-investments-grow-record-253-billion-2011)//AMV

Investment in renewable energy surged again in 2011, according to two new reports issued by United Nations Environment Programme (UNEP) and the Renewable Energy Policy Network for the 21st Century (REN21). Using data collected by Bloomberg New Energy Finance, the world's authority on cleantech financing, UNEP's Global Trends in Renewable Energy Investment 2012 report found that investment in renewable energy grew 17% to $253 billion in 2011, despite an increasingly tough competitive landscape. This is a six-fold increase from the investment numbers of 2004. In relation, gross investment in fossil fuels in 2011 was $302 billion. Nevertheless, **renewables continue to gain ground in the power sector**. Last year, 44% of the power generated at new power installations came from renewable sources. This is up from 34% in 2010. The big winner in 2011 appears to be the solar power. The industry saw investment grow 52% to $147 billion last year, making it the most attractive cleantech sector for investors -- surpassing wind power, the long-time favourite for clean energy financiers. In response to the report, Dr. Udo Steffens, President and CEO of the Frankfurt School of Finance & Management, said: "Renewables are starting to have a very consequential impact on energy supply, but we're also witnessing many classic symptoms of rapid sectoral growth -- big successes, painful bankruptcies, international trade disputes and more. This is an important moment for strategic policymaking as winners in the new economy form and solidify. The United States offers a fantastic case study for Dr. Steffens. New national energy policy focused around developing a new energy economy is completely impossible in the short-term. Nevertheless, other policies and regulations such as the Production Tax Credit for Renewable Energy helped spur a 57% increase in renewable investments in the U.S. last year, as companies scrambled to take advantage of the expiring incentives. Renewable energy investment in the U.S. grew to $51 billion in 2011, almost returning the economic giant to the top of the list of global renewable energy investors. Only China, stands ahead of the United States. After supplanting the U.S. in 2009, China maintained its title as the world's largest cleantech financier by increasing its investments by 17% to $52 billion. Despite the influx of capital and an increase in renewable energy capacity, solar power, for example, grew by 140% in 2011, the United States felt the pain of an expanding and maturing industry as several manufacturers filed bankruptcies. Solyndra, Beacon Power, Evergreen Solar, Stirling Energy, and most recently Konarka Technologies are the most notable companies that have been forced out of the market this year. Critics, in particular, members of the Republican party, have pointed to these failings as a sign of an unstable, and deteriorating industry. Michael Liebrich, CEO of Bloomberg New Energy Finance, see the situation in a completely different light. "Right now we are seeing a lot of pain on the supply-side as prices are being compressed, but it is important to remember that installers, generators and consumers are benefiting. It is all part of the maturing of the sector." He continued, "In 1903, the United States had over 500 car companies, most of which quickly fell by the wayside even as the automobile sector grew into an industrial juggernaut. A century ago, writing off the auto industry based on the failures of weaker firms would have been foolish. Today, the renewable energy sector is experiencing similar growing pains as the sector consolidates." Both the UNEP and REN21 reports join a symphony of reports concluding the single most important catalyst to developing a robust clean energy economy is implementing strong, stable renewable energy policies.

### Brink – Narrow Gap

#### Narrow time frame to avoid environmental collapse

Sawin 10 - Senior Researcher and the Director of the Energy and Climate Change Program at the Worldwatch Institute

Janet, “The coming energy revolution,” http://www.peopleandplanet.net/?lid=26272&section=36&topic=44

And while the road will not be easy, the benefits will be many and great. Renewables are already providing enormous benefits to millions of people around the world, in addition to the energy that they produce. Worldwide, more than 2.5 million people now have jobs in the renewable energy sector. In 2006, approximately 230,000 people were employed in renewables industries in Germany alone. A July 2007 draft report by the German government estimates that renewable energy avoided the release of more than 100 million tons of carbon dioxide (CO2) in Germany in 2006 - the equivalent of taking more than 18 million U.S. cars off of that nation's roads. In addition, the German government estimated in 2007 that the net economic benefits of renewable electricity to German consumers now amount to about 6 billion euros per year. In other words, the benefits of fuel-import savings, environmental and health benefits of renewable electricity, and an associated decline in wholesale electricity prices all far exceed any additional costs to consumers of producing and using renewable power. Renewables provide a host of other benefits as well, by helping to advance rural development in industrial and developing countries alike, improving energy security, and providing cleaner air and water and improved human health. We have a brief window of opportunity to start down the path to a more sustainable world - one in which rising demand for energy is met without sacrificing the needs of current and future generations and the natural environment. If the world is to achieve this goal - which it must - countries need to begin today to make the transition to a renewable, sustainable energy future.

### 2nc Link Run

#### CCS entrenches reliance on fossil fuels

Tady 7 - national political reporter

Megan, “Carbon Capture: Miracle Cure for Global Warming, or Deadly Liability?,” Alternet, http://www.alternet.org/environment/68490/?page=4

But to others, CCS is a bridge that should never be built because of where it could lead. Matt Leonard, a campaigner with the Rainforest Action Network, a group calling for a coal moratorium, said CCS is a public relations scheme to pave the way for new coal-fired power plants. "The coal industry is grasping at straws trying to find some way to convince the public that they have a place in our future energy policy," Leonard said. "And carbon sequestration is their attempt to brand some kind of PR campaign to have clean coal be a possibility." Jutta Kill, a climate change expert for the UK's Forests and the European Union Resource Network, said CCS diverts the public's attention away from cutting ties with the coal industry, and instead entrenches reliance on fossil fuels. "Coal-fired power stations are being built with the promise that this technology will be there one day in the future," Kill said. "It's a very dangerous way of spending a lot of money on a very risky technology and financing new coal-fired power stations, when that supposed remedy is very far-off into the future, and we may well find that it isn't going to work. And then there are all those coal-fired power stations that shouldn't have been built in the first place."

#### The plan trades off with clean energy and efficiency

EJLFCC 8

Environmental Justice Leadership Forum on Climate Change, The Fallacy of Clean Coal, http://www.jtalliance.org/docs/Fallacy\_of\_Clean\_Coal.pdf

The impact that government financial support has on the development and adoption of wide-scale energy technology cannot be understated. As with any government spending, the money that goes toward coal limits the resources available for other energy R&D. The continued absorption of coal’s financial costs by the federal government through investment in CCS technology will cause investment in renewable energy and efficiency to suffer. 37 In addition, government investment in CCS restricts financial investments in energy subsidies, green jobs, and efficiency programs that target low-income communities. This unintended consequence is particularly unacceptable for community groups working to position the new “green economy” as a way to bring jobs and resources to un- and underemployed populations. For these groups and others working to improve environmental, public health, and economic equality, a massive shift in government investments is needed to make alternative energy sources viable. Continuing to invest billions in non-renewable energy sources like CCS diverts funds away from new clean technologies and delays full-scale climate change mitigation strategies.

#### CCS trades off with renewables

Tady 7 - national political reporter

Megan, “Carbon Capture: Miracle Cure for Global Warming, or Deadly Liability?,” Alternet, http://www.alternet.org/environment/68490/?page=4

Critics of CCS say the high cost of CCS technology could make electricity more expensive, while not driving down the costs of renewable energy. "If that's the case, instead of spending an enormous amount of money sequestering that carbon, you should spend money accelerating the production of new power so you can close that plants down," Morris said. Kill fears that investment in CCS will reduce financial commitments to renewable energy. "With limited money, the more that's spent on technological fixes such as carbon sequestration, the less money will be available for research and development into energy storage, renewable energy and into overhauling the national electricity grid so they work best for renewable energy," Kill said.

#### CCS trades off with capital for renewables – locks us into coal and prevents transition to clean energy

Sorensen 10

Brenda, “An Illusion Called the Carbon Capture and Storage,” IDN, http://www.indepthnews.net/news/news.php?key1=2010-06-02%2016:05:12&key2=1

Palle Bendsen said: "Financing CCS is doomed to be a huge misuse of public funds. Our report shows why. EU and governments should direct their subsidies exclusively to energy conservation, energy efficiency and renewables, as well as finance development of sustainable energy supply systems in developing countries. That’s the way to secure decreasing emissions." "CCS will lock in coal. Though far from being commercially ready, CCS is being used as an excuse to continue to build coal power plants that are 'CCS-ready.' But such plants will be preserved unchanged for many years to come. ‘CCS-ready’ is a meaningless term," he added. "It is obvious that CCS is competing with renewables for R&D resources and capital, thus preventing the rapid development of sustainable energy supply systems. What we need is a fossil free future. We must reduce energy demands in rich countries with high emissions, and we must increase energy efficiency," Palle Bendsen added.

#### The plan undercuts demand for green consumption

Tady 7 - national political reporter

Megan, “Carbon Capture: Miracle Cure for Global Warming, or Deadly Liability?,” Alternet, http://www.alternet.org/environment/68490/?page=4

But Kill is not flipping quarters. She's adamant that CCS is a false solution to climate change. "It avoids confronting and being outspoken about the need for a significant overhaul in how we produce and use energy," she said. "The appeal of geological carbon sequestration is that it promises to continue using energy as wastefully as we have done and that it doesn't require any significant changes in the way we use and produce electricity."

#### Distracts attention and investment from renewable technologies

Tady 7 - national political reporter

Megan, “Carbon Capture: Miracle Cure for Global Warming, or Deadly Liability?,” Alternet, http://www.alternet.org/environment/68490/?page=4

"[CCS] distracts from the real task at hand, and that real task at hand is leaving a large proportion of fossil fuels that are still in the ground where they are," Kill said. Kill said transitioning away from fossil fuels is possible with dedicated public investment in renewable energy and other low-carbon technologies. But in continuing down the path toward CCS, she said, "It's very likely that a trade-off will have to be made, and unfortunately it's clear that the trade-off will be to the disadvantage of the decentralized renewable energies we believe hold much more promise than this technological fix that may or may not work."

#### Plan trades off with renewable energy

Rochon et al 08 Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne (Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**CCS diverts resources away from real solutions**

In recent years, **the share of research and development budgets in countries pursuing CCS has ballooned**, with CCS often included as part of renewable energy packages. **Meanwhile, funding for real renewable technologies and efficiency has stagnated or declined**. The US DOE’s fiscal year 2009 budget seeks a 26.4% increase (US$493.4 million in FY 2008 vs. US$623.6 million in FY 2009) in funding for CCS-related programmes, at the same time it is scaling back programmes tied to renewable energy and efficiency research and cutting budgets by 27.1% (US$211.1 million in FY 2008 vs. US$146.2 million in FY 2009).137 Australia has three cooperative Research Centres for fossil fuels, one particularly committed to CCS. There is not one for renewable energy technology.138

### Link – Investment Finite

#### The plan necessitates a tradeoff

McMorrow 11

“The tech cluster glut,” Boston Globe, http://articles.boston.com/2011-07-09/bostonglobe/29756001\_1\_cluster-south-boston-innovation

SOMEBODY IN Boston is about to get burned by the promise of high-tech development. Boston has four major medical and biotech clusters in various stages of assemblage. They’re all competing with Cambridge. Increasingly, it’s looking like Crosstown, the mayor’s last attempt at research-driven neighborhood-building, will be the odd cluster out, a victim of the city’s successes along the South Boston waterfront Research clusters exist because good things happen when like-minded folks, be they colleagues or competitors, work alongside each other. By definition, clusters demand density. The bigger they are, the better. The opposite is true, too: As interdependent clusters are fractured and watered down, the returns they produce diminish. And since there’s only so much venture capital and government research funding to fight over, their potential size is finite as well. Every attempt at tech-cluster development around Boston has Cambridge looming in its rear-view mirror. Kendall Square is the hub of New England’s innovation economy. And notwithstanding South Boston’s recent encroachment into Cambridge’s lunchbox, Kendall is as huge a draw as ever. Three recent deals, by Novartis, the Broad Institute, and Biogen more than replaced the square footage vacated by Vertex’s defection across the Charles. Biogen’s tentative move is especially significant. The biotech firm decamped Cambridge for sparkling new headquarters in Weston just last year, and got buyer’s remorse almost immediately afterward. The company reportedly missed the community and access to talent that Cambridge offers. Now it’s scrambling to get back into Kendall, and it will likely pay a premium to do so.

#### Investment capital is finite

Fuhrman 8 - Chairman & CEO at China First Capital, a leading investment bank serving China’s most successful and high-growth private companies, assisting them with PRE-IPO private equity financing as well as mergers and acquisitions

China Private Equity, “Infinite Opportunities ÷ Finite Capital,” http://www.chinafirstcapital.com/blog/archives/17

So, we needed quite a bit of time to explain things. Opportunities in business are infinite, but capital is finite resource. Investors want to achieve the highest risk-adjusted return possible. But, equally, they will determine how much capital to invest not purely, or even primarily, based on the potential return. They will also give strong consideration to issues of corporate control, valuation, ROI, even asset coverage.

### Impact – Renewables Key to Tech Leadership

#### Key to clean tech leadership

Chu 11-3 – US Energy Secretary

Steven, “Secretary Chu: America Faces a Choice to “Compete in the Clean Energy Race” or “Wave the White Flag”,” Re-posted @ http://thinkprogress.org/romm/2011/11/03/360402/secretary-chu-clean-energy-race/

Once again, there is a huge opportunity before us – a global clean energy market that is already worth an estimated $240 billion and is **growing rapidly**. In fact, a very reasonable estimate is that solar photovoltaic systems alone represent a global market worth more than $80 billion this year. China – like many countries – has learned from the U.S. how government can support critical emerging industries. Last year, China offered roughly $30 billion in government financing to its solar companies, including $7 billion to Suntech. At least 10 countries have adopted renewable electricity standards, and more than 50 countries offer some type of public financing for clean energy projects. For example, Germany and Canada operate government-backed clean energy lending programs, and in the last several months, the UK, Australia, and India have announced plans to do the same. America faces a choice today: Are we going to recognize the opportunity and compete in the clean energy race or will we wave the white flag and watch all of these jobs go to China, Korea, Germany and other countries? The global competition is fierce, and support for innovative technologies comes with inherent risk. Not every company or every product will succeed, but that is no reason to sit on the sidelines and concede leadership in clean energy. Some in Washington are ready to throw in the towel and write off the clean energy industry. They don’t think America can compete or they don’t think it’s worth trying. Others think that the best thing we can do is for the government to get out of the way and let the free market work. To those in Washington who say we cannot or should not compete, I say: that’s not who we are. In America, when we fall behind, we don’t give up. We dig in and come back. Why should we concede one of the biggest growing markets in the world that is in our sweet spot: technological and manufacturing innovation? America has the opportunity to **lead the world in clean energy technologies** and provide the **foundation** for our prosperity. We remain the most innovative country in the world … but “Invented in America” is not good enough. We need to ensure that these technologies are invented in America, made in America and sold around the world. That’s how we’ll prosper in the 21st century.

### Impact – Laundry List

**The US needs to create clean tech—key to solve warming, employment, and prevent foreign energy dependence**

**Hall 6/20** Founder & Vice President Ioxus, Inc. (Chad, June 20, 2012, “Cleantech Industry Powers US Economy with Job Creation,”[http://www.environmentalleader.com/2012/06/20/cleantech-industry-powers-us-economy-with-job-creation/)//DR](http://www.environmentalleader.com/2012/06/20/cleantech-industry-powers-us-economy-with-job-creation/%29//DR)**.** H

**Green technology not only helps to sustain the environment, but it also helps to sustain the US economy by providing new jobs.** A Brookings Institution report estimates that **between 2008 and 2011, the number of green jobs in the US grew 260 percent from 750,000 to 2.7 million. Much of this job creation stems from the increased awareness of**, and demand for, **green technology by the consuming public.**

Manufacturing New Jobs

**With an increased focus on job creation during this election year, one particular sector has seen ongoing growth: manufacturing.** According to the US Bureau of Labor Statistics’ April 2012 Employment Situation Summary, **the manufacturing industry added 489,000 jobs in the US since January 2010. With the high demand for green technology and sustainable energy solutions comes the growth of jobs in the cleantech manufacturing industry. The Brookings Institution also reports more jobs in the green technology and renewable energy industries than in the fossil fuel sector**, with 26 percent of cleantech jobs being in manufacturing.

**An increase in job creation will directly impact the domestic economy and job market—so long as we make** manufacturing **advancements** in the US and create **and sustain the jobs. Developing and manufacturing energy storage technology domestically results in national profit from cost savings, environmental benefits, increased job availability and national competitive advantage.**

With the development and improvement of energy storage technology such as ultracapacitors, the prices of these systems will drop, leading to mass adoption of applications that use them, such as electric vehicles. As a result**, consumers will experience significant fuel cost savings, and harmful emissions will be less likely to enter the atmosphere. The continued demand for better energy storage options results in more jobs created in the ultracapacitor manufacturing industry.** Companies in the space will expand their product lines, resulting in more hiring across their businesses, from manufacturing to sales to administration.

Small Businesses Equals Big Job Opportunities

According to a recent report by the US Small Business Administration, small businesses outperformed large companies in net job creation by about 75 percent from 1992-2010. **This growth coupled with the nation’s entrepreneurial spirit contributes to the United States’ competitive advantage by innovating, creating jobs and stimulating economic recovery.** Another study by the US Small Business **Administration finds small businesses responsible for much of the green technology innovation. Small businesses hold 14 percent of all US green technology patents. Given the job creation by small businesses coupled with the innovation within the green technology space, it only makes sense that opportunities with small businesses in green technologies will abound.**

Made in the USA

**In addition to creating new jobs in the clean technology manufacturing space, we’re also witnessing increases in American companies reshoring and bringing jobs back home.**

While offshoring was once popular due to the reduced operational costs in overseas markets, reshoring has a growing appeal due to such factors as high fuel prices raising shipping and transport costs. A survey conducted by engineering professor and supply-chain expert, David Simchi-Levi of the Massachusetts Institute of Technology, found that 39 percent of U.S. manufacturers were contemplating moving some of their manufacturing operations back to the US. By reshoring various business operations and not just manufacturing jobs, c**ompanies not only help the American job market, but also gain better quality control. There is value and pride in having a product labeled as both a green technology and “made in America.”** Domestic manufacturing of clean technology improves a company’s image with both internal and external stakeholders, creating pride among employees and a strong reputation with the public and customers. Not only that, but **it taps into a sense of patriotism for having impacted the U.S. economy by producing more exports and more domestic jobs.**

**If the US fails to take the initiative to design and manufacture innovations in renewable energy, we will miss out, and our foreign competitors will reap the benefits. We will move from a dependency on foreign oil to a dependency on foreign energy storage.** President Obama echoed this sentiment in his State of the Union address in January, proposing tax incentives for companies bringing their operations back to the U.S. and tax penalties for those who do not. He declared, “It’s time to stop rewarding businesses that ship jobs overseas, and start rewarding companies that create jobs right here in America.”

The End Goal

**Cleantech manufacturing provides the necessary support to increase the nation’s renewable energy output. Cost-efficiency, savings and a greater number of jobs are great perks resulting from the growth of the cleantech industry, but the main goal of clean technology remains the widespread adoption of renewable energy applications for a cleaner, more sustainable environment.**

**Green economy solves warming, the economy, and national security**

**Hendricks and Caperton 9/2** Hendricks: Senior Fellow at American Progress, Works at the interface of global warming solutions and economic development, longtime leader in promoting policies that create green jobs, sustainable infrastructure, and investment in cities, Caperton: Director of Clean Energy Investment at American Progress, Former policy fellow at the Alliance for Climate Protection (Bracken Hendricks, Richard W. Caperton, September 2, 2011, “A Green Bank Is the Right Tool for Jobs,” [http://www.americanprogress.org/issues/2011/09/green\_bank\_jobs.html)//DR](http://www.americanprogress.org/issues/2011/09/green_bank_jobs.html%29//DR). H

**Protecting our national security, growing our economy, and avoiding the most catastrophic effects of global climate change require massively restructuring our energy system. Over the next 10 years the United States needs to move from a fossil-fuel-based economy to one powered by clean, domestic energy. Navigating this transition will require hundreds of billions of dollars in new capital investment** from both public and private sources. **We also need to reverse the current jobs crisis** in a time of tight federal budgets and financial austerity. **The solution is a Green Bank, which is the right tool to unlock private capital investment to renew America’s energy infrastructure and create jobs.**

A transformed clean energy economy will rely on both deploying existing and proven technologies and the development of new highly innovative, high-growth technologies and business practices that today are still being developed in laboratories and business incubators. The U.S. government has an important function in developing better tools for financing and commercializing new energy solutions and bringing them to commercial scale. Through a tool such as **the Green Bank the government also will support private investor leadership in unlocking this dynamic engine of jobs, growth, and competitiveness.**

**The United States will not remain a global leader in technology innovation in the clean energy sector without a sustained effort to move advanced energy** from basic research, to early phase R&D, through to commercialization, manufacturing at scale, and the deployment of these technologies in functioning energy markets. **Meeting this challenge has tremendous implications for America’s economic recovery and the global competitiveness of U.S. industries.**

Yet very real structural barriers exist to financing this technology innovation process and sustaining the new jobs and industries it already supports. These financial market barriers are over and above the cyclical investment challenges that already hurt new investment as a result of the global economic downturn.

Many of our economic competitors already established clean energy finance entities to overcome these barriers. Sustainable Development Technology Canada provides a useful model, as well as green banks in the United Kingdom, Germany, and China. Launching a Green Bank financing facility here in the United States to attract new private capital to key domestic investments on our shores offers a proven, market-driven, and truly bipartisan approach to reigniting capital markets in support of American business innovation.

**This memo outlines a specific proposal to improve private capital markets for clean energy investment in the United States through the development of a dedicated independent Green Bank, which can be pursued either as a standalone facility or within the context of a broader program of infrastructure finance.**

**Green economy solves poverty, patriarchy, and job growth**

**Harvey 5/31** Environment Correspondent at Financial Times (Fiona, May 31, 2012, “Switching to a Green Economy Could Mean Millions of Jobs,” [http://www.motherjones.com/environment/2012/05/green-economy-job-growth-un)//DR](http://www.motherjones.com/environment/2012/05/green-economy-job-growth-un%29//DR). H

**Tens of millions of new jobs can be created around the world in the next two decades if green policies are put in place to switch the high-carbon economy to low-carbon**, the UN has said.

**Between 15 million and 60 million additional jobs are likely**, according to a new report from the United Nations Environment Program (UNEP). **These are net gains in employment for the world economy, taking into account any job losses in high-carbon industries that fail to transform.**

Achim Steiner, executive director of UNEP, said: "The findings underline that **[the green economy] can include millions more people in terms of overcoming poverty and delivering improved livelihoods for this and future generations.** It is a positive message of opportunity in a troubled world of challenges."

**As well as generating net new gains in the number of jobs, the switch to a green economy could help to lift millions of people out of poverty.**

In the US, **there are now about three million green jobs**, in sectors such as wind power and energy efficiency, the study found. In the UK, the number is close to one million and has been one of the few areas of the economy that has been creating jobs. There are about 500,000 people working in green jobs in Spain. In the developing world, too, **the number is growing rapidly**—about 7 percent of people employed in Brazil, amounting to three million people, are now **in the green economy.**

However, **realizing the full potential of green jobs depends on countries taking action to develop the green economy and bringing in policies that will foster investment**, according to the report.

Juan Somavia, director general of the International Labour Organisation, which was co-author of the report, said: "**The current development model has proven to be inefficient and unsustainable, not only for the environment, but for economies and societies as well. We urgently need to move to a sustainable development path with a coherent set of policies, with people and the planet at the center."**

He rebuffed claims that greening industry would lead to job losses, because of the changes to some traditional industries such as fossil fuel extraction. He said: "**Environmental sustainability is not a job killer, as it is sometimes claimed. On the contrary**, if properly managed**, it can lead to more and better jobs, poverty reduction and social inclusion.**

Some areas are more vulnerable to losses—global fishing fleets, for instance, will probably have to be reduced if overfishing is to be tackled, and fishermen will have to be found new employment. But the report found that **long-term sustainable management could avoid job losses.** For instance, **an estimated one million people in Asia may have lost jobs in forestry** because of poor resource management, **which could have been largely avoided with better policies and enforcement.**

**Jobs easily identified as "green"**—workers in renewable energy, for instance, maintaining forests or installing insulation—**are not the only ones to be touched by the shift to a more environmentally sustainable economy. At least half of the global workforce will be affected in some way by 2030**, the study found. This will stretch from people whose industrial processes are overhauled to cut greenhouse gases, to farmers who change their methods to be more environmentally friendly, and workers in the construction industry who begin to install new greener materials.

Some of the sectors identified in the report as being most affected by the changes include agriculture, forestry, fishing, energy, resource-intensive manufacturing, recycling, building and transport.

**Women could benefit—if the shift is managed properly it could provide them with better access to jobs and higher incomes.**

The study, "Working Towards Sustainable Development: Opportunities for Decent Work and Social Inclusion in a Green Economy," has been timed to be published ahead of World Environment Day next week, and to inform discussions at the landmark Rio+20 environmental conference, where **nations will attempt to work on a new set of targets and agreements to help halt environmental degradation around the world.**

### Impact – Clean Energy Race – Race Up for Grabs

#### Clean energy race is up for grabs

Jenkins 10-27 - Director of Energy and Climate Policy at the Breakthrough Institute

Jesse, “U.S. Gets A Do-Over On Clean Energy And A New Chance To Dominate,” http://www.forbes.com/sites/energysource/2011/10/27/america-gets-a-do-over-on-clean-energy-and-a-chance-to-dominate-market/2/

For security, economic, and environmental reasons, the global energy system is modernizing and diversifying. Developing and developed nations alike will move toward new forms of advanced energy technologies that reduce dependence on foreign nations, insulate their economies from volatile energy markets, and are cleaner and thus less costly from a public health perspective. Supplying this massive global market with reliable and affordable clean energy technologies thus represents one of the **most significant market opportunities** of the 21st century. In this clean energy race, pole position is still up for grabs. China may have cornered today’s subsidy-dependent markets for solar cells in recent years, but they have **not yet won the race** to make solar energy cheap. Chinese firms have achieved recent cost advantages by simply scaling up yesterday’s solar technology, wringing cost declines out of gigawatt-scale manufacturing supply chains and capitalizing on both a temporary glut in refined silicon and lucrative Chinese state subsidies. None of these factors are truly repeatable, and technology and market analysts project that China’s solar cost declines will soon stall out well above the levels necessary to make solar power truly affordable and subsidy-independent. America is still home to the most innovative solar firms, from technology leaders like First Solar making advanced thin film solar technologies to SunPower Corp., the manufacturer of the world’s most efficient crystalline PV panels. And we retain a global lead in venture capital investment and clean energy research. Yet to win this race to make clean energy cheap, America must overcome two threats, one each from both home and abroad.

### Impact – Solves Warming Better

#### Renewables – especially solar and wind – solve warming better than CCS – prefer our evidence, it’s comparative

Bergeron 8 (Louis, “Wind, water and sun beat other energy alternatives, study finds”, http://news.stanford.edu/news/2009/january7/power-010709.html)

The best ways to improve energy security, mitigate global warming and reduce the number of deaths caused by air pollution are blowing in the wind and rippling in the water, not growing on prairies or glowing inside nuclear power plants, says Mark Z. Jacobson, a professor of civil and environmental engineering at Stanford**. And "clean coal," which involves capturing carbon emissions and sequestering them in the earth, is not clean at all**, he asserts. Jacobson has conducted the first quantitative, scientific evaluation of the proposed, major, energy-related solutions by assessing not only their potential for delivering energy for electricity and vehicles, but also their impacts on global warming, human health, energy security, water supply, space requirements, wildlife, water pollution, reliability and sustainability. His findings indicate that the options that are getting the most attention are between 25 to 1,000 times more polluting than the best available options. The paper with his findings will be published in the next issue of Energy and Environmental Science but is available online now. Jacobson is also director of the Atmosphere/Energy Program at Stanford. "The energy alternatives that are good are not the ones that people have been talking about the most. And some options that have been proposed are just downright awful," Jacobson said. "Ethanol-based biofuels will actually cause more harm to human health, wildlife, water supply and land use than current fossil fuels." He added that ethanol may also emit more global-warming pollutants than fossil fuels, according to the latest scientific studies. The raw energy sources that Jacobson found to be the most promising are, in order, wind, concentrated solar (the use of mirrors to heat a fluid), geothermal, tidal, solar photovoltaics (rooftop solar panels), wave and hydroelectric. **He recommends against** nuclear, coal with **carbon capture and sequestration**, corn ethanol and cellulosic ethanol, which is made of prairie grass. In fact, he found cellulosic ethanol was worse than corn ethanol because it results in more air pollution, requires more land to produce and causes more damage to wildlife. To place the various alternatives on an equal footing, Jacobson first made his comparisons among the energy sources by calculating the impacts as if each alternative alone were used to power all the vehicles in the United States, assuming only "new-technology" vehicles were being used. Such vehicles include battery electric vehicles (BEVs), hydrogen fuel cell vehicles (HFCVs), and "flex-fuel" vehicles that could run on a high blend of ethanol called E85. Wind was by far the most promising, Jacobson said, owing to a better-than 99 percent reduction in carbon and air pollution emissions; the consumption of less than 3 square kilometers of land for the turbine footprints to run the entire U.S. vehicle fleet (given the fleet is composed of battery-electric vehicles); the saving of about 15,000 lives per year from premature air-pollution-related deaths from vehicle exhaust in the United States; and virtually no water consumption. By contrast, corn and cellulosic ethanol will continue to cause more than 15,000 air pollution-related deaths in the country per year, Jacobson asserted. Because the wind turbines would require a modest amount of spacing between them to allow room for the blades to spin, wind farms would occupy about 0.5 percent of all U.S. land, but this amount is more than 30 times less than that required for growing corn or grasses for ethanol. Land between turbines on wind farms would be simultaneously available as farmland or pasture or could be left as open space. Indeed, a battery-powered U.S. vehicle fleet could be charged by 73,000 to 144,000 5-megawatt wind turbines, fewer than the 300,000 airplanes the U.S. produced during World War II and far easier to build. Additional turbines could provide electricity for other energy needs. "There is a lot of talk among politicians that we need a massive jobs program to pull the economy out of the current recession," Jacobson said. **"Well, putting people to work building wind turbines, solar plants, geothermal plants, electric vehicles and transmission lines would not only create jobs but would also reduce costs due to health care, crop damage and climate damage from current vehicle and electric power pollution, as well as provide the world with a truly unlimited supply of clean power."** Jacobson said that while some people are under the impression that wind and wave power are too variable to provide steady amounts of electricity, his research group has already shown in previous research that by properly coordinating the energy output from wind farms in different locations, the potential problem with variability can be overcome and a steady supply of baseline power delivered to users. Jacobson's research is particularly timely in light of the growing push to develop biofuels, which he calculated to be the worst of the available alternatives. In their effort to obtain a federal bailout, the Big Three Detroit automakers are increasingly touting their efforts and programs in the biofuels realm, and federal research dollars have been supporting a growing number of biofuel-research efforts. "That is exactly the wrong place to be spending our money. Biofuels are the most damaging choice we could make in our efforts to move away from using fossil fuels," Jacobson said. "We should be spending to promote energy technologies that cause significant reductions in carbon emissions and air-pollution mortality, not technologies that have either marginal benefits or no benefits at all". "Obviously, wind alone isn't the solution," Jacobson said. "It's got to be a package deal, with energy also being produced by other sources such as solar, tidal, wave and geothermal power." During the recent presidential campaign, nuclear power and clean coal were often touted as energy solutions that should be pursued, but nuclear power and coal with **carbon capture and sequestration were Jacobson's lowest-ranked choices after biofuels**. "**Coal with carbon sequestration emits 60- to 110-times more carbon and air pollution than wind energy**, and nuclear emits about 25-times more carbon and air pollution than wind energy," Jacobson said. Although carbon-capture equipment reduces 85-90 percent of the carbon exhaust from a coal-fired power plant, it has no impact on the carbon resulting from the mining or transport of the coal or on the exhaust of other air pollutants. In fact, **because carbon capture requires a roughly 25-percent increase in energy from the coal plant, about 25 percent more coal is needed,** increasing mountaintop removal and increasing non-carbon air pollution from power plants, he said. Nuclear power poses other risks. Jacobson said it is likely that if the United States were to move more heavily into nuclear power, then other nations would demand to be able to use that option. "Once you have a nuclear energy facility, it's straightforward to start refining uranium in that facility, which is what Iran is doing and Venezuela is planning to do," Jacobson said. "The potential for terrorists to obtain a nuclear weapon or for states to develop nuclear weapons that could be used in limited regional wars will certainly increase with an increase in the number of nuclear energy facilities worldwide." Jacobson calculated that if one small nuclear bomb exploded, the carbon emissions from the burning of a large city would be modest, but the death rate for one such event would be twice as large as the current vehicle air pollution death rate summed over 30 years. Finally, both coal and nuclear energy plants take much longer to plan, permit and construct than do most of the other new energy sources that Jacobson's study recommends. **The result would be even more emission**s from existing nuclear and coal power sources as people continue to use comparatively "dirty" electricity while waiting for the new energy sources to come online, Jacobson said. Jacobson received no funding from any interest group, company or government agency. Energy and vehicle options, from best to worst, according to Jacobson's calculations: Best to worst electric power sources: 1. Wind power 2. concentrated solar power (CSP) 3. geothermal power 4. tidal power 5. solar photovoltaics (PV) 6. wave power 7. hydroelectric power 8. a tie between nuclear power and coal with carbon capture and sequestration (CCS). Best to worst vehicle options: 1. Wind-BEVs (battery electric vehicles) 2. wind-HFCVs (hydrogen fuel cell vehicles) 3.CSP-BEVs 4. geothermal-BEVs 5. tidal-BEVs 6. solar PV-BEVs 7. Wave-BEVs 8.hydroelectric-BEVs 9. a tie between nuclear-BEVs and coal-CCS-BEVs 11. corn-E85 12.cellulosic-E85. Hydrogen fuel cell vehicles were examined only when powered by wind energy, but they could be combined with other electric power sources. Although HFCVs require about three times more energy than do BEVs (BEVs are very efficient), HFCVs are still very clean and more efficient than pure gasoline, and wind-HFCVs still resulted in the second-highest overall ranking. HFCVs have an advantage in that they can be refueled faster than can BEVs (although BEV charging is getting faster). Thus, HFCVs may be useful for long trips (more than 250 miles) while BEVs more useful for trips less than 250 miles. An ideal combination may be a BEV-HFCV hybrid.

### Impact – Employment

#### Key to job creation and solves unemployment

Poe 11 - Partner at Polachi, the leading provider of Access Executive Search™ services to technology, clean tech, venture capital and private equity clients

Source: Clean Technica

“Jobs and the Cleantech VC Boom,” http://cleantechnica.com/2011/05/02/jobs-and-the-cleantech-vc-boom/

The recently released data reporting a substantial increase in overall Venture Capital Investment and, in particular, a near record increase for the cleantech sector, should come as encouraging news on the employment front. What is more significant than overall invested capital ($2.57 billion for Cleantech, up 52% from the previous quarter) is that the number of deals remained nearly flat, which means of course that the deal-size is up significantly. A closer look reveals that the majority of the dollars committed went to later-stage deals, many to fund scale up and commercialization phase activities, therefore driving job creation across a number of functions. Demand at the executive level can be expected in the form of growth-stage CEO requirements to help take these businesses to the next level now that they are moving from the startup and technology validation stage. With the possible exception of the solar segment, many of the other major sectors of Clean Energy will grow through licensing, JVs, and strategic alliance models. This translates into search requirements for senior executives in Business Development, Commercial Development, and Corporate Development roles as well as for CFOs with significant transaction experience. For those companies in the process of building out their operations component, searches should spike for senior talent with global supply chain backgrounds, especially in Asia. Beyond the executive level, growth in the cleantech industry is widely expected to make a **sign**ificant contribution to employment as we continue to pull out of recession. In Massachusetts, for example, a 20-fold increase in solar energy systems installed since 2007 has more than doubled jobs in that category during the same period, according to a recent article in Mass High Tech. There are more than 11,000 people employed in clean energy in the state as of the end of 2010, up an impressive 65% since 2007. While the New England region is recognized as the 2nd largest concentration of Cleantech companies in the US, if anything resembling this rate of job growth can be expected in other regions (most likely already far surpassed in California), the sector should not disappoint from a jobs perspective. As the Cleantech sector is still largely comprised of innovative small businesses, many of which are now moving to the next phase of their trajectory, such an impressive infusion of fresh capital as seen in Q1 can only mean greater opportunities in the near term. While some pundits of the VC business overall may question whether this could be another “bubble”, and only time will really tell, a look back at the pre-recession levels of investment indicates that we are now back to that level, at least on a quarterly basis. Assuming the economy as a whole has gained enough strength to continue expanding as government supports are withdrawn, we should expect to see the cleantech engine shift into a higher gear and continue to claim an increasing share of the available VC and Private Equity pie. It is a capital- and people-intensive model, after all.

### Impact – Economy

#### A successful transition to renewables boosts economic growth

Fraunhofer-Gesellschaf 11The largest organization for applied research in Europe. Our research is directed to the needs of people: health, safety, communication, mobility, energy and the environment (July 25, 2011, “Transition to Renewable Energy Stimulates the Economy, German Researchers Say,” Science Daily, [http://www.sciencedaily.com/releases/2011/07/110725091451.htm)//DR](http://www.sciencedaily.com/releases/2011/07/110725091451.htm%29//DR). H

ScienceDaily (July 25, 2011) — **The transition to renewable energy is set to deliver an economic pay off as well in the years to come.** Various studies show that **a shift to alternative energy sources will raise the GNP in the coming decade and create new jobs**, as Prof. Eicke Weber, spokesperson for the Fraunhofer Energy Alliance, points out. Fraunhofer **scientists are developing concepts and solutions for the transition as it takes shape.**

**The disaster at Fukushima has raised public awareness and made the shift to renewable sources of energy more desirable than ever.** It is accompanied, too, by a political willingness to rethink and correct the policies followed until now. The question is often posed in public debate as to whether the shift to renewable energies will be too expensive, or whether it indeed poses a threat to Germany's competitiveness as an industrial location.

Over the last two years, however, studies have suggested that fears of this sort are unfounded. On the contrary, according to an EU study performed by the Fraunhofer Institute for Systems and Innovation Research ISI in Karlsruhe, a **shift towards renewable energies will stimulate growth in the job market in the coming decade. By 2020 scientists predict that some 2.8 million people will be employed in Europe's renewable energy sector**, once implementation of EU objectives in this area has taken hold. **The negative impact of a shift to alternative energy is far outweighed by the remaining positive net effect of some 400,000 additional jobs** in the EU as a whole. What is more, Europe's GDP is expected to grow by 0.24 % (some 35 billion Euro).

Similar results were reported in a study of Germany contracted by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety BMU, in which ISI scientists participated. One of the study's findings showed that "the short and long-term effects on the German labor market derived from expansion of renewable energy use, indicate a positive trend. When all negative effects and influences on the economic cycle are taken into account, the number still falls in the range of 120.000 -- 140,000 new jobs (2020, optimistic scenario, price path A)."

Presenting the study's finding at a press conference, Fraunhofer President Prof. Hans-Jörg Bullinger emphasized the Fraunhofer-Gesellschaft's committed efforts in this field of research: "**We are perfectly positioned to develop concepts and solutions for a transition to renewable energy**. Within the Fraunhofer Energy Alliance alone there are **some 2000 scientists from 16 organizations** whose work is focused in this sector. They **develop system technologies such as power grids and energy storage systems and research new ways to increase energy efficiency.** There are also additional teams of scientists from the Building Innovation and Traffic and Transport Alliances, who also devote a significant part of their work to the question of energy."

Renewable energy is affordable

"The transition to sustainable energy supplies is one of the greatest challenges of the 21st century," asserts Prof. Eicke Weber, spokesperson for the Fraunhofer Energy Alliance and Director of the Fraunhofer Institute for Solar Energy Systems ISE in Freiburg. "**To keep electricity, heat and transportation prices affordable in the future, we have to use energy more efficiently and devote more research to the development of renewable sources.**" Dr. Mario Ragwitz of the ISI, who coordinated the EU study, further emphasizes, "**We must sustain investment in renewable energy. And we must be patient.**" But it is worth the effort, **not only to secure the supply of raw materials and to protect the environment, but also economically from a mid- to long-term perspective**, a conclusion also reached in a study by the Renewable Energy Research Association FVEE.

Another study entitled "Vision for a 100 percent renewable energy system," illustrates how a reliable, affordable and robust energy supply based on renewable sources can be achieved in Germany by the year 2050. "The expansion of renewable energy creates additional costs initially; however, **costs should peak in 2015** at a total of about 17 billion Euro. **That is only about eight percent of total costs for energy** in Germany, **and costs will sink again after that.** Between 2010 and 2050, **overall savings of some 730 billion Euro can be achieved in the electricity and heating sectors alone**," reports Prof. Jürgen Schmid, Director of the Fraunhofer Institute for Wind Energy and Energy System Technology IWES in Kassel, summarizing the results of the study.

**Solar energy will become increasingly more competitive**

**It is also clear that the costs of renewable energy will fall.** "We predict, for example, that the price trend for photovoltaic modules (PV) will continue to follow a price-learning curve in the years ahead," says Eicke Weber. This trend assumes that the price of PV modules, currently between € 1.50 und € 2.00/Wp (net), could fall below € 1.00/Wp as early as 2016, which would put electricity generation costs in Germany in a range between 11 and 14 cents per kilowatt hour. **The prerequisites for this reduction in costs are the further development of production, effective utilization of production capacities through corresponding growth in the global PV market, the continual implementation of technological innovations in production, and minimization of production processes and costs.**

#### Solves energy costs

**GIT 10** (Georgia Institute of Technology, August 26, 2010, “Policies to Spur Renewable Energy Can Lower Energy Costs,” Science Daily, [http://www.sciencedaily.com/releases/2010/12/101216101839.htm)//DR](http://www.sciencedaily.com/releases/2010/12/101216101839.htm%29//DR). H

ScienceDaily (Dec. 16, 2010) — Southern **USA could pay less for its electricity in 20 years than is currently projected if strong public policies are enacted to spur renewable energy production and use**, according to a report released December 16 by researchers at the Georgia Institute of Technology and Duke University. The 190-page report, "Renewable Energy in the South," builds on a short policy brief released last summer and provides an in-depth assessment of the scope of renewable energy resources in the South and their economic impacts on electricity rates and utility bills in the region.

Skeptics of renewable energy production often cite the South as lacking renewable resources. However, the new report confirms that **the right mix of public policies could drive the region to produce as much as 30 percent -- up from less than 4 percent -- of its electricity from renewable sources by 2030. Wind, biomass, hydro power and customer-owned renewables stand out** as cost savers and are detailed for both utility-scale and customer-owned renewable, based **on their cost-competitiveness.**

"**While the South enjoys some of the lowest electricity rates in the country, there is resistance to developing new technologies that seem much more costly than coal based electricity,**" said Etan Gumerman of Duke University's Nicholas Institute for Environmental Policy Solutions and a co-lead researcher on the study. "In reality, that's not the case."

With a customized version of the economic modeling system used by the U.S. Energy Information Administration (EIA), researchers found that if **supportive policies and tax incentives are implemented or extended, total regional energy costs would be 7 percent less by 2030 than they are projected to be if policies do not change.** If no new policies are adopted, the EIA predicts the average electricity rates in the South will rise from the current 7.9 cents to 9.7 cents per kilowatt hour in 2030 -- a 23 percent increase. The study finds that with a mix of policies designed to promote renewable energy, rates would rise to only 9 cents per kilowatt hour in 2030, saving electricity users in the region $23 billion a year.

**The report examines the economic impact of a number of renewable energy policies**, including expanded research funding and tax incentives (such as those debated in several recent legislative initiatives) and the enactment of a national Renewable Electricity Standard (RES). In addition to considering the potential for large-scale energy producers to generate renewable energy, the report finds that end-users, such as **households equipped with solar panels and industry with the ability to recycle waste heat, could generate a significant amount of the South's renewable electricity.**

### Impact – Clean Tech Solves Warming

#### Clean tech solves warming

Zervos & Coequyt 7 - European Renewable Energy Council & Climate & Energy Unit @ Greenpeace

Arthouros, and John, Climate &, “Increasing Renewable Energy in U.S. Can Solve Global Warming”, 1-24, http://www.renewableenergyworld.com/rea/news/infocus/story?id=47208

The good news first. Renewable energy, combined with energy efficiency, can meet half of the world's energy needs by 2050. This new report, "Energy Revolution: A Blueprint for Solving Global Warming," shows that it is not only economically feasible, but also economically desirable, to cut U.S. CO2 emissions by almost 75% within the next 43 years. These reductions can be achieved without nuclear power, and while virtually ending U.S. dependence on coal. Contrary to popular opinion, a massive uptake of renewable energy and efficiency improvements alone can solve our global warming problem. All that is missing is the right policy support from the President and Congress. The bad news is that time is running out. The overwhelming consensus of scientific opinion is that the global climate is changing and that this change is caused in large part by human activities; if left unchecked, it will have disastrous consequences for Earth's ecosystems and societies. Furthermore, there is solid scientific evidence that we must act now. This is reflected in the conclusions of the Intergovernmental Panel on Climate Change (IPCC), a collaborative effort involving more than 1,000 scientists. Its next report, due for release early this year, is expected to make the case for urgent action even stronger. In the United States there is a groundswell of activity at the local and state levels. Many mayors, governors, and public and business leaders are doing their part to address climate change. But they can only do so much; action is needed at the federal level. Now is the time for a national, science-based cap on greenhouse gas emissions. It's time for a national plan to address global warming. Such a plan will create jobs, improve the security of America's energy supply, and protect Americans from volatile energy prices. It will restore America's moral leadership on the critical international issue of climate change. And real action in the United States will inspire confidence as the rest of the world negotiates future global commitments to address climate change. In addition to global warming, other energy-related challenges have become extremely pressing. Worldwide energy demand is growing at a staggering rate. Over-reliance on energy imports from a few, often politically unstable, countries, and volatile oil and gas prices, have together pushed energy security to the top of the political agenda, while threatening to inflict a massive drain on the global economy. But while there is a broad consensus that we need to change the way we produce and consume energy, there is still disagreement about what changes are needed and how they should be achieved. The Energy Scenario The European Renewable Energy Council (EREC) and Greenpeace International commissioned this report from the Department of Systems Analysis and Technology Assessment (Institute of Technical Thermodynamics) at the German Aerospace Centre (DLR). The Worldwatch Institute was hired to serve as a technical consultant for the U.S. and North American portions of the report. The report presents a scenario for how the United States can reduce CO2 emissions dramatically and secure an affordable energy supply on the basis of steady worldwide economic development through the year 2050. Both of these important aims can be achieved simultaneously. The scenario relies primarily on improvements in energy efficiency and deployment of renewable energy to achieve these goals. The future potential for renewable energy sources has been assessed with input from all sectors of the renewable energy industry, and forms the basis of the Energy [R]evolution Scenario. The Potential for Renewable Energy Renewable energy technologies such as wind turbines, solar photovoltaic panels, biomass power plants, solar thermal collectors, and biofuels are rapidly becoming mainstream. The global market for renewable energy is growing dramatically; global investment in 2006 reached US$38 billion, 26% higher than the previous year. The time window available for making the transition from fossil fuels to renewable energy is relatively short. Today, energy companies have plans to build well over 100 coal-burning power plants across the United States; if those plants are built, it will be impossible to reduce CO2 emissions in time to avoid dangerous climate impacts. But it is not too late yet. We can solve global warming, save money, and improve air and water quality without compromising our quality of life. Strict technical standards are the only reliable way to ensure that only the most efficient transportation systems, industrial equipment, buildings, heating and cooling systems, and appliances will be produced and sold. Consumers should have the opportunity to buy products that minimise both their energy bills and their impact on the global climate.

#### Technology is sufficient

Cheeseman 9

Gina-Marie Cheeseman, Writer for care2, a web magazine, “Is Clean Tech the Solution to Global Warming?” December 31st, 2009, <http://www.care2.com/causes/is-clean-tech-the-solution-to-global-warming.html>

“If there is a solution to global warming it will be technological, not political, in nature,” a recent [editorial](http://www.dunnconnect.com/articles/2009/12/27/opinion/doc4b36692f2a0e0870593018.txt)  proclaimed. At COP15, the International Chamber of Commerce (ICC) held a side event to highlight the need for business to deploy clean technology. Jean-Yves Caneill, sustainable development project manager for Electricité de France [said](http://www.iccwbo.org/iccdecge/index.html) that there are already technologies in existence which “can help decarbonizes the economy.” He added that “successful deployment conditions” need to be created along with progressively building the international architecture. Peter Taylor, head of the Energy Technology Policy Division for the International Energy Agency (IEA) said, “The IEA believes that technology will be at the heart of the discussion. Whatever Copenhagen’s outcome, it is vital to marry the public and private sectors in order to spread clean technology as fast as possible. “Stimulating sustainability and economic growth in developing countries requires a different way of looking at technology, finance and regional partnerships from the energy and electricity sectors,” said Wendy Poulton, Chair, ICC Energy Task Force A [study](http://www.gigatonthrowdown.org/intro.php) by the Gigaton Throwdown Initiative released last summer identified seven clean technologies that could be drastically scaled up by 2020 in order to reduce carbon dioxide emissions by one gigaton (one billion tons), which is equivalent to the installed capacity of 205 gigawatts (GW). The seven clean technologies are:  biofuels, building efficiency, concentrating solar power, construction materials, geothermal, solar photovoltaics, and wind According to the study, each clean technology will need considerable amounts of investment to achieve gigaton scale by 2020. Biofuels-$383 billion investment Building efficiency-$61 billion to achieve gigaton scale Concentrating solar power-$2.24 trillion Construction materials-$445 billion Geothermal-$919 billion Solar photovoltaics-$2.1 trillion Wind- $1.38 trillion Current investment in clean tech This year, South Korea  devoted 80 percent of its economic stimulus package to clean technology. Now the South Korean government is predicting that manufacturing companies will invest over $3.4 billion in its clean technology sector in 2010, up from $2.7 billion in 2009. A senior government official [told Reuters](http://www.businessgreen.com/business-green/news/2255494/south-korea-ramp-clean-tech) earlier this month, “The government will help private firms raise their investment in clean technology by preparing new policies to expand the industries, for instance requiring public buildings to consume renewable energy.” He added, “The government would rather help more private funds to be spent in clean and renewable energy sectors as lots of private funds are already out there.” China, South Korea, and Japan will invest $519 billion in clean technology between 2009 and 2013, according to a [study](http://www.treehugger.com/files/2009/11/asia-to-outspend-usa-in-clean-technology-energy.php) by the Breakthrough Institute and the Information Technology and Innovation Foundation, titled Rising Tigers, Sleeping Giant. The U.S.  government will only invest $172 billion. Between 2000 and 2008 the U.S. attracted $52 billion in private capital for renewable energy technologies. The Cleantech Group predicts that clean tech in the U.S. will be the largest recipient of venture capital funding. Clean tech received approximately 25 percent of all venture capital investment during the third quarter of 2009. Mark Heesen, president of the National Venture Capital Association [said](http://www.financierworldwide.com/article_printable.php?id=5514), “Cleantech investing by US venture firms has grown from under 5 percent of venture investing just several years ago to 15 percent of venture investing in 2008. Two-thirds of the $1.6 billion invested in clean tech by venture capital firms globally was invested into U.S.  firms, according to the Cleantech Group. Solar-based technologies received $451 million, the largest amount of investment. Cleantech transportation technologies, including biofuels, received $383 million. Green buildings received $110 million Read more: <http://www.care2.com/causes/is-clean-tech-the-solution-to-global-warming.html#ixzz1RzyABRMe>

### AT: Can’t Meet Demand

#### Renewables can meet global demand

RNLSE 10One of Europe's leading research laboratories in sustainable energy and is a significant player in nuclear technologies(Risø National Laboratory for Sustainable Energy, November 16, 2010, “Carbon Dioxide-Free Energy Can Meet the World’s Energy Needs in 2050, Danish Report Finds,” Science Daily, [http://www.sciencedaily.com/releases/2010/11/101116075800.htm)//DR](http://www.sciencedaily.com/releases/2010/11/101116075800.htm%29//DR). H

ScienceDaily (Nov. 16, 2010) — Taken as a whole, energy sources with low or no carbon emissions could easily cover the global energy supply in 2050, according to a new report from Denmark's Risø National Laboratory for Sustainable Energy. The challenge for a sustainable global energy system with low carbon emissions will be to use this potential in the energy system the best way possible seen from an economic point of view. Risø Energy Report 9 lists a wide range of energy technologies in the market with low or no emissions of greenhouse gases, describing how several of these will be made commercially available in the next decades.

## Earthquakes DA

### 1nc

#### CCS triggers Earthquakes and those earthquakes destroy CO2 repositories – means aff can’t solve

**Zoback and Gorelick 5/4/12**

[Mark D. Zoback Professor at the Department of Geophysics at Stanford University, and Steven M. Gorelick Professor of Environmental Earth System Sciences at Stanford University, “Earthquake triggering and large-scale geological storage of carbon dioxide” Found on the Proceedings of the National Academy of Sciences, May 4th, 2012 /SM]

Despite its enormous cost, large-scale carbon capture and storage (CCS) is considered a viable strategy for significantly reducing CO2 emissions associated with coal-based electrical power generation and other industrial sources of CO2 We argue here that there is a high probability that earthquakes will be triggered by injection of large volumes of CO2 into the brittle rocks commonly found in continental interiors. Because even small- to moderate-sized earthquakes threaten the seal integrity of CO2 repositories, in this context, large-scale CCS is a risky, and likely unsuccessful, strategy for significantly reducing greenhouse gas emissions.

#### Unchecked natural disasters cause extinction

**Sid-Ahmed 5**[Mohamed Sid-Ahmed, political activist, writer and journalist with Al-Ahram Weekly, January 2005 “The post-earthquake world” Al-Ahram Weekly Online http://weekly.ahram.org.eg/2005/724/op3.htm]

The contradiction between Man and Nature has reached unprecedented heights, forcing us to re-examine our understanding of the existing world system. US President George W Bush has announced the creation of an international alliance between the US, Japan, India, Australia and any other nation wishing to join that will work to help the stricken region overcome the huge problems it is facing in the wake of the tsunamis. Actually, the implications of the disaster are not only regional but global, not to say cosmic. Is it possible to mobilise all the inhabitants of our planet to the extent and at the speed necessary to avert similar disasters in future? How to engender the required state of emergency, that is, a different type of inter-human relations which rise to the level of the challenge before contradictions between the various sections of the world community make that collective effort unrealisable? The human species has never been exposed to a natural upheaval of this magnitud3e within living memory. What happened in South Asia is the ecological equivalent of 9/11. Ecological problems like global warming and climatic disturbances in general threaten to make our natural habitat unfit for human life. The extinction of the species has become a very real possibility, whether by our own hand or as a result of natural disasters of a much greater magnitude than the Indian Ocean earthquake and the killer waves it spawned. Human civilisation has developed in the hope that Man will be able to reach welfare and prosperity on earth for everybody. But now things seem to be moving in the opposite direction, exposing planet Earth to the end of its role as a nurturing place for human life. Today, human conflicts have become less of a threat than the confrontation between Man and Nature. At least they are less likely to bring about the end of the human species. The reactions of Nature as a result of its exposure to the onslaughts of human societies have become more important in determining the fate of the human species than any harm it can inflict on itself.

### 2nc Link

#### CCS leads to earthquakes – tank solvency

Hopkin 11 – MSc from East Anglia in Climate Science

Kathy, “Carbon capture and storage – the silver bullet of climate change mitigation?,” The Graduate Times, http://www.graduatetimes.com/news/environment/2011/02/25/carbon-capture-and-storage-the-silver-bullet-of-climate-change-mitigation/

But we’re entering unknown territory here; CCS is a new concept that has not been done on a large scale before, and little is known about its longevity. For example, how great are the risks of stored carbon escaping back into the atmosphere? If carbon dioxide is buried beneath rocks, it may cause large amounts of minerals (including carbonates that naturally seal pores and fractures in geological sites) to dissolve. Furthermore, research conducted at Stanford University found that underground stores of carbon dioxide have the potential to cause earthquakes. Although these would not necessarily be major earthquake events, they would be enough to damage the seal of an underground storage reservoir, thus leaking stored CO2 back into the atmosphere and rendering the whole process futile.

### 2nc Impacts

#### Earthquakes independently turn the case

**CEE 92** [Committee on Earthquake Engineering, National Research Council, 1992 “The Economic Consequences of a Catastrophic Earthquake: Proceedings of a forum” http://www.nap.edu/catalog.php?record\_id=2027]

Occurrence of a hazard event, such as a serious earthquake, has both immediate and long-run effects on city economic development. The immediate effect is based on destruction of capital, both industrial plant and equipment and housing. This results in lower realized rates of return on capital and lower real wages than were anticipated. Government assistance programs may raise these realized rates of return by compensating firms and households for immediate damage to capital. The relationship between payments to replace damaged capital equipment and the true measure of immediate damage (based on the difference between expected rates of return and real wages and realized rate of return and real wages) is problematical. It is possible for some individuals to be damaged substantially, through loss of expected real wages, without sustaining any capital loss that is the object of direct government compensation. Similarly, the replacement cost of business plant and equipment bears an uncertain relationship to losses in expected returns. The long-run effects of a natural-hazard event arise because firms and workers will produce new estimates of expected returns and real wages based on experience of a disaster. Specifically, experience of a serious earthquake may cause firms to lower their expected returns to plant and equipment investment and workers to lower expected real wages, so that capital and labor are encouraged to locate outside the city.

#### Low wage workers will destroy the economy

**Petro 10** [ John PetroUrban Policy Analyst at the Drum Major Institute for Public Policy, “ Growth of Low Wage Jobs Puts City Economy on Shaky Ground” The Huffington Post http://www.huffingtonpost.com/john-petro/growth-of-low-wage-jobs-p\_b\_580918.html]

With the Senate on the verge of voting on financial reform legislation, there are many who fret about the impact that reform will have on New York City's economy. After all, the city has already lost about 48,000 financial sector jobs since 2007. Mayor Bloomberg has warned that the city's economy is "very dependent" on the financial sector, and that new regulations will hurt the city's ability to grow back high-paying finance sector jobs. But there is another trend in the city's job market that should be keeping the Mayor up at night: the growth of low-paying service sector jobs in New York City. Already one in three working New Yorkers are in jobs that pay less than $24,000 a year. And the city's fastest growing occupations are also those that pay poverty-level wages, like home health aides and retail workers. This growth has the potential to destabilize the city's economy, as more and more families are dependent on poverty-level jobs to make ends meet. I'm not talking about pure altruism here. Poverty-level jobs hurt everyone, from Mom and Pop business owners to fat-cat bankers. When every dollar goes towards basic necessities like food and rent, families supported by low-wage work are unable to contribute more to the city's economy, hurting neighborhood retailers and the city's tax base. Low-wage work has serious impacts on consumer spending in the local economy. Economists at the Federal Reserve Bank of Chicago found that boosting wages for low-income families by $1 an hour results in nearly $3,500 in new spending at local businesses over the course of a year. Multiply that by thousands of families and it adds up to a tremendous amount of new spending flowing to small neighborhood businesses. Instead of relying on Wall Street bonuses to trickle down to small businesses, we're talking about generating wealth from the bottom up. Currently low-wage jobs act as a millstone around the city economy's neck. Less consumer spending by working families in poverty means fewer tax dollars flowing to city coffers, and families that earn poverty-level wages are forced to rely on public assistance to make ends meet. The growth of low-wage work is not just a New York phenomenon. Richard Florida, professor and author of the new book The Great Reset, notes that more than 40 percent of Americans work in low-wage service sector jobs. Asked what we can do about it, Florida replies, "Companies need to try to engage workers and ask them to think innovatively about their work processes." But cities across the country are taking control of low-wage work, transforming poverty-level jobs into good paying jobs that help families get by and stimulate economic growth. In Los Angeles the city ensures that every job that is created through economic development subsidies is a good job with good wages and benefits. But in New York, Mayor Bloomberg has resisted efforts to create good jobs through economic development subsidies when he flatly refused to support living wage jobs at the Kinsgbridge Armory redevelopment earlier this year. Other cities are going even further. Santa Fe and San Francisco both have citywide minimum wages that are above the federal minimum wage. According to Paul Sonn of the National Employment Law Project, "The 2004 increase in San Francisco's minimum wage is estimated to have boosted spending in low-income communities by as much as $70 to $90 million annually." With New York ten times the size of San Francisco, the benefit for local businesses could potentially be ten times as great. Any attempts to raise wages through a citywide minimum wage would likely be fiercely opposed by Mayor Bloomberg. Instead, the mayor is putting his hopes on the financial sector to save the city's economy--the very same sector that brought the national and city economies to their knees. But even if the financial sector employment grows back to where it was before the financial crisis, the prevalence of low-wage work will still keep the city's economy from reaching its full potential.

#### Nuclear war

**Green and Schrage, 9** [Michael J Green is Senior Advisor and Japan Chair at the Center for Strategic and International Studies (CSIS) and Associate Professor at Georgetown University. Steven P Schrage is the CSIS Scholl Chair in International Business and a former senior official with the US Trade Representative's Office, State Department and Ways & Means Committee, “It's not just the economy,”March 26 http://www.atimes.com/atimes/Asian\_Economy/KC26Dk01.html]

Facing the worst economic crisis since the Great Depression, analysts at the World Bank and the US Central Intelligence Agency are just beginning to contemplate the ramifications for international stability if there is not a recovery in the next year. For the most part, the focus has been on fragile states such as some in Eastern Europe. However, the Great Depression taught us that a downward global economic spiral can even have jarring impacts on great powers. It is no mere coincidence that the last great global economic downturn was followed by the most destructive war in human history. In the 1930s, economic desperation helped fuel autocratic regimes and protectionism in a downward economic-security death spiral that engulfed the world in conflict. This spiral was aided by the preoccupation of the United States and other leading nations with economic troubles at home and insufficient attention to working with other powers to maintain stability abroad. Today's challenges are different, yet 1933's London Economic Conference, which failed to stop the drift toward deeper depression and world war, should be a cautionary tale for leaders heading to next month's London Group of 20 (G-20) meeting. There is no question the US must urgently act to address banking issues and to restart its economy. But the lessons of the past suggest that we will also have to keep an eye on those fragile threads in the international system that could begin to unravel if the financial crisis is not reversed early in the Barack Obama administration and realize that economics and security are intertwined in most of the critical challenges we face. A disillusioned rising power? Four areas in Asia merit particular attention, although so far the current financial crisis has not changed Asia's fundamental strategic picture. China is not replacing the US as regional hegemon, since the leadership in Beijing is too nervous about the political implications of the financial crisis at home to actually play a leading role in solving it internationally. Predictions that the US will be brought to its knees because China is the leading holder of US debt often miss key points. China's currency controls and full employment/export-oriented growth strategy give Beijing few choices other than buying US Treasury bills or harming its own economy. Rather than creating new rules or institutions in international finance, or reorienting the Chinese economy to generate greater long-term consumer demand at home, Chinese leaders are desperately clinging to the status quo (though Beijing deserves credit for short-term efforts to stimulate economic growth). The greater danger with China is not an eclipsing of US leadership, but instead the kind of shift in strategic orientation that happened to Japan after the Great Depression. Japan was arguably not a revisionist power before 1932 and sought instead to converge with the global economy through open trade and adoption of the gold standard. The worldwide depression and protectionism of the 1930s devastated the newly exposed Japanese economy and contributed directly to militaristic and autarkic policies in Asia as the Japanese people reacted against what counted for globalization at the time. China today is similarly converging with the global economy, and many experts believe China needs at least 8% annual growth to sustain social stability. Realistic growth predictions for 2009 are closer to 5%. Veteran China hands were watching closely when millions of migrant workers returned to work after the Lunar New Year holiday last month to find factories closed and jobs gone. There were pockets of protests, but nationwide unrest seems unlikely this year, and Chinese leaders are working around the clock to ensure that it does not happen next year either. However, the economic slowdown has only just begun and nobody is certain how it will impact the social contract in China between the ruling communist party and the 1.3 billion Chinese who have come to see President Hu Jintao's call for "harmonious society" as inextricably linked to his promise of "peaceful development". If the Japanese example is any precedent, a sustained economic slowdown has the potential to open a dangerous path from economic nationalism to strategic revisionism in China too. It is noteworthy that North Korea, Myanmar and Iran have all intensified their defiance in the wake of the financial crisis, which has distracted the world's leading nations, limited their moral authority and sown potential discord. With Beijing worried about the potential impact of North Korean belligerence or instability on Chinese internal stability, and leaders in Japan and South Korea under siege in parliament because of the collapse of their stock markets, leaders in the North Korean capital of Pyongyang have grown increasingly boisterous about their country's claims to great power status as a nuclear weapons state. The junta in Myanmar has chosen this moment to arrest hundreds of political dissidents and thumb its nose at fellow members of the 10-country Association of Southeast Asian Nations. Iran continues its nuclear program while exploiting differences between the US, UK and France (or the P-3 group) and China and Russia - differences that could become more pronounced if economic friction with Beijing or Russia crowds out cooperation or if Western European governments grow nervous about sanctions as a tool of policy. It is possible that the economic downturn will make these dangerous states more pliable because of falling fuel prices (Iran) and greater need for foreign aid (North Korea and Myanmar), but that may depend on the extent that authoritarian leaders care about the well-being of their people or face internal political pressures linked to the economy. So far, there is little evidence to suggest either and much evidence to suggest these dangerous states see an opportunity to advance their asymmetrical advantages against the international system. The trend in East Asia has been for developing economies to steadily embrace democracy and the rule of law in order to sustain their national success. But to thrive, new democracies also have to deliver basic economic growth. The economic crisis has hit democracies hard, with Japanese Prime Minister Aso Taro's approval collapsing to single digits in the polls and South Korea's Lee Myung-bak and Taiwan's Ma Ying Jeou doing only a little better (and the collapse in Taiwan's exports - particularly to China - is sure to undermine Ma's argument that a more accommodating stance toward Beijing will bring economic benefits to Taiwan). Thailand's new coalition government has an uncertain future after two years of post-coup drift and now economic crisis. The string of old and new democracies in East Asia has helped to anchor US relations with China and to maintain what former secretary of state Condoleezza Rice once called a "balance of power that favors freedom". A reversal of the democratic expansion of the past two decades would not only impact the global balance of power but also increase the potential number of failed states, with all the attendant risk they bring from harboring terrorists to incubating pandemic diseases and trafficking in persons. It would also undermine the demonstration effect of liberal norms we are urging China to embrace at home.

### 2nc Impact – Probability

#### Even a small risk of leaks turns the case

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**As long as CO2 is present in geological formations, there is a risk of leakage – it can migrate laterally or upwards to the surface.** In contact with water, **CO2 becomes corrosive and can compromise the integrity of cap rocks, well casings and cement plugs. Undetected fractures in cap rocks or those created by injecting CO2 at too high a pressure can provide another avenue for CO2 to escape. Improper design and construction of wells can also create opportunities for leakage.**121 The implications for climate mitigation as well as the other environmental and public health risks make leakage a serious concern.

**Preventing leaks will largely rely upon careful technology choices**, project design, plant operation and reservoir selection. The IPCC notes that **the fraction of CO2 retained in “geological reservoirs is very likely to exceed 99% over 100 years and is likely to exceed 99% over 1000 years”.**122 However, these findings are only valid for well-selected, fully characterised, properly designed and managed storage locations. At the moment, **sufficient capacity in high quality reservoirs cannot be assured**, nor can their appropriate design and management be guaranteed. **It is likely that some CO2 storage will occur in lower quality sites, without proper management**. In these cases, **the risk of leakage could be even greater.**

For example, a CCS experiment in Texas (see “**Storing carbon underground can have unintended consequences**”, page 26) found CO2 injected into saline sedimentary aquifers caused carbonates and other minerals to dissolve rapidly. This could allow CO2 and brine to leak into the water table.123 While it is not currently possible to quantify the exact risk of leakage, **any CO2 release has the potential to impact the surrounding environment; air, groundwater or soil.**

Most computer models suggest **leakage will occur fastest in the first 50-100 years of a project’s lifetime**, before trapping mechanisms take effect. Others indicate that little happens in the first 1000-year period with leakage most likely to occur over the following 3000 to 5000 year period.124 Either way, **even a tiny rate of leakage could undermine any putative climate benefit of CCS. A leakage rate of just 1%** on 600 Gt of stored carbon (2160 GtCO2 or about 100 years’ worth of CO2 emissions from fossil fuels), **could release as much as 6Gt of carbon** (21.6 GtCO2) **per year** back into the atmosphere. **This is roughly equivalent to current total global CO2 emissions from fossil fuels.**125 **Remediation may be possible for CO2 leaks but there is no track record or cost estimates for these sorts of measures.126**

### XT: Econ Turn

#### An earthquake will damage the economy

**CEE 92** [Committee on Earthquake Engineering, National Research Council, 1992 “The Economic Consequences of a Catastrophic Earthquake: Proceedings of a forum” http://www.nap.edu/catalog.php?record\_id=2027]

 First, a review of the literature on economic consequences of disasters must be conducted. Second, the issue iu placed in general context of economic theory by analyzing the relationship between natural hazards and economic development of a region. A hazard event, such as a serious earthquake, has a direct and immediate effect on the capital stock of a region and on the physical health of its residents. Then there is a long-run effect that follows the event as the expectations for future productivity of the region change. It is important to consider both the immediate and the long-run effects when attempting to characterize economic effects of hazards on a region.

### Earthquake/Natural Disaster Impacts

#### Earthquakes spark great power war

**Brancati 7** (Dawn, Academic Employment - Harvard University, Institute for Quantitative Social Science; 2007; "Political Aftershocks: The Impact of Earthquakes on Intrastate Conflict", 51-5, http://jcr.sagepub.com/cgi/content/refs/51/5/715)

Earthquakes, I argue, promote intrastate conflict by increasing competition among groups for scarce resources (e.g., food, water, housing, medicine, and relief aid). Scarcities, in turn, provoke frustrations, which lead to anger and violence. Their effects are greater in economically developing countries than in developed ones since earthquakes have more severe consequences in the former than in the latter. Earthquakes also have larger effects in countries already experiencing conflict since rebels can capitalize on earthquakes to attract popular support, recruit soldiers, and finance campaigns.

### AT: No Areas in US susceptible

#### Faults in the US, Canada, and Asia are susceptible to stress induced earthquakes

**Zoback and Gorelick 5/4/12**

[Mark D. Zobacka, and Steven M. Gorelick

Departments of Geophysics and Environmental Earth System Science, Stanford University, “Earthquake triggering and large-scale geological storage of carbon dioxide” Found on the Proceedings of the National Academy of Sciences, May 4th, 2012 /SM]

Before embarking on projects to inject enormous volumes of CO2 at numerous sites around the world, it is important to note that over time periods of just a few decades, modern seismic networks have shown that earthquakes occur nearly everywhere in continental interiors. Fig. 1, Upper shows instrumentally recorded earthquakes in the central and eastern United States and southeastern Canada. Fig. 1, Lower shows instrumentally recorded intraplate earthquakes in south and east Asia (4). The seismicity catalogs are complete to magnitude (M) 3. The occurrence of these earthquakes means that nearly everywhere in continental interiors a subset of the preexisting faults in the crust is potentially active in the current stress field (5, 6). This is sometimes referred to as the critically stressed nature of the brittle crust (7). It should also be noted that despite the overall low rate of earthquake occurrence in continental interiors, some of the most devastating earthquakes in history occurred in these regions. In eastern China, the M 7.8, 1976 Tangshan earthquake, approximately 200 km east of Beijing, killed several hundred thousand people. In the central United States, three M 7+ earthquakes in 1811 and 1812 occurred in the New Madrid seismic zone in southeast Missouri.

### AT: Alt Cause – Water Waste

#### Water waste only has a small impact – CO2 injection causes the most damage

**Zoback and Gorelick 5/4/12**

[Mark D. Zoback Professor at the Department of Geophysics at Stanford University, and Steven M. Gorelick Professor of Environmental Earth System Sciences at Stanford University, “Earthquake triggering and large-scale geological storage of carbon dioxide” Found on the Proceedings of the National Academy of Sciences, May 4th, 2012 /SM]

Deep borehole stress measurements confirm the critically stressed nature of the crust in continental interiors (12), in some cases at sites directly relevant to the feasibility of large-scale CCS. For example, deep borehole stress measurements at the Mountaineer coal-burning power plant on the Ohio River in West Virginia indicate a severe limitation on the rate at which CO2 could be injected without the resulting pressure build-up initiating slip on preexisting faults (13). Because of the low permeability of the formations at depth, pore pressure increases would be expected to trigger slip on preexisting faults if CO2 injection rates exceed approximately 1% of the 7 million tons of CO2 emitted by the Mountaineer plant each year. Similarly, stress measurements at Teapot Dome, Wyoming, the US governmentowned oil field where pilot CO2 injection projects have been considered, show that very small pressure buildups are capable of triggering slip on some preexisting faults (14). Dam construction and water reservoir impoundment produce much smaller pore pressure changes at depth than are likely to occur with CO2 sequestration, but many have triggered earthquakes at various sites around the world (15) (red dots in Fig. 1). Except for the much smaller pore pressure increases at depth, reservoir-triggered earthquakes are a good analog for the potential for seismicity to be triggered by CO2 injection. Both activities cause pore pressure increases that act over large areas and are persistent for long periods.

### AT: Alt Cause – Fracking

#### CCS-induced earthquakes are more powerful than those caused by fracking

Borenstein, 12( Seth Borenstein, staff writer, "Fracking-Earthquake Report Suggests Low Risk For Large Tremors", Huffington Post, 6/15/12, [www.huffingtonpost.com/2012/06/15/fracking-earthquakes-low-risk\_n\_1600515.html](http://www.huffingtonpost.com/2012/06/15/fracking-earthquakes-low-risk_n_1600515.html))

The man-made quakes that Ellsworth has been seeing are almost all related to wastewater injection, he said. Ellsworth said he agreed with the research council that "hydraulic fracturing does not seem to pose much risk for earthquake activity." If the country starts capturing the global warming gas carbon dioxide from coal power plants and injecting it underground, there is a potential for a larger quakes given the amount of the heat-trapping gas that would have to be buried, the council's report said. That's an issue that needs more study, it said.

### XT: Pressure Cause Earthquakes

#### Even a tiny increase in pressure results in earthquakes

**Zoback and Gorelick 5/4/12**

[Mark D. Zoback Professor at the Department of Geophysics at Stanford University, and Steven M. Gorelick Professor of Environmental Earth System Sciences at Stanford University, “Earthquake triggering and large-scale geological storage of carbon dioxide” Found on the Proceedings of the National Academy of Sciences, May 4th, 2012 /SM]

Many CCS research projects are currently underway around the world. Much of this work involves characterization and testing of potential storage formations and includes a number of small-scale pilot injection projects. Because the storage capacity/ pressure build-up issue is critical to assess the potential for triggered seismicity, small-scale pilot injection projects do not reflect how pressures are likely to change (increase) once full-scale injection is implemented. Moreover, even though limitations on pressure build-up are among the many factors that are evaluated when potential formations are considered as sequestration sites, this is usually done in the context of not allowing pressures to exceed the pressure at which hydraulic fractures would be initiated in the storage formation or caprock. In the context of a critically stressed crust, slip on preexisting, unidentified faults could trigger small- to moderate-sized earthquakes at pressures far below that at which hydraulic fractures would form. As mentioned above, sequences of small to moderate earthquakes were apparently induced by injection of waste water near Guy, Arkansas, Trinidad, Colorado, and Youngstown, Ohio in 2011 and on the Dallas-Ft. Worth airport, Texas. Although these earthquakes were widely felt, they caused no injury, and only the Trinidad earthquake resulted in any significant damage. However, had similar earthquakes been triggered at sites where CO2 was being injected, the impacts would have raised pressing and important questions: Had the seal been breached? Was it still safe to leave previously injected CO2 in place? In summary, multiple lines of evidence indicate that preexisting faults found in brittle rocks almost everywhere in the earth’s crust are subject to failure, often in response to very small increases in pore pressure. In light of the risk posed to a CO2 repository by even small- to moderate-sized earthquakes, formations suitable for large-scale injection of CO2 must be carefully chosen. In addition to being well sealed by impermeable overlaying strata, they should also be weakly cemented (so as not to fail through brittle faulting) and porous, permeable, and laterally extensive to accommodate large volumes of CO2 with minimal pressure increases. Thus, the issue is not whether CO2 can be safely stored at a given site; the issue is whether the capacity exists for sufficient volumes of CO2 to be stored geologically for it to have the desired beneficial effect on climate change. In this context, it must be recognized that large-scale CCS will be an extremely expensive and risky strategy for achieving significant reductions in greenhouse gas emissions.

#### High probability of earthquakes will occur post storing carbon

**Sheridan 6/18** [Kerry Sheridan. Health and science correspondent at Agence France-Presse, Past Senior Editor “Carbon capture too risky, earthquake prone” Mother Nature Network, June 18th, 2012 http://www.mnn.com/earth-matters/wilderness-resources/stories/carbon-capture-too-risky-earthquake-prone]

A proposed method of cutting harmful carbon emissions in the atmosphere by storing them underground risks causing earthquakes and is unlikely to succeed, a U.S. study said Monday. The warning came in a Perspective article in the Proceedings of the National Academy of Sciences, just days after another independent U.S. study warned that carbon capture and storage risked causing earthquakes. CCS is currently considered a "viable strategy" by the UN Intergovernmental Panel on Climate Change for pollution control from coal-based electrical power generation and other industrial sources of carbon dioxide, said the PNAS study. But while no large-scale projects are yet under way, the huge volume of fluid that would need to be stored below ground for long periods of time make the notion unrealistic, argued the study by experts at Stanford University in California. "There is a high probability that earthquakes will be triggered by injection of large volumes of CO2 into the brittle rocks commonly found in continental interiors," said the article by Mark Zobacka and Steven Gorelick, professors in the departments of Geophysics and Environmental Earth System Science. "Because even small- to moderate-sized earthquakes threaten the seal integrity of CO2 repositories, in this context, large-scale CCS is a risky, and likely unsuccessful, strategy for significantly reducing greenhouse gas emissions." The technique aims to reduce carbon dioxide emissions to the atmosphere by capturing, liquefying and injecting them below ground at high volumes. For CCS to work on a global scale, it would need to eliminate about 3.5 billion tons of C02 per year, or about the same volume as 28.6 billion barrels, said the study, noting that about 27 billion barrels of oil are produced yearly worldwide. "Before embarking on projects to inject enormous volumes of CO2 at numerous sites around the world, it is important to note that over time periods of just a few decades, modern seismic networks have shown that earthquakes occur nearly everywhere in continental interiors," said the study. CCS would also require an underground leak rate of less than one percent per thousand years "to achieve the same climate benefits as renewable energy sources," it said. Underground injections of wastewater have already been linked to small to moderate earthquakes in the United States in recent years, it said, citing one apparent case as early as 1960 in Colorado and others last year in Arkansas and Ohio. "The situation would be far more problematic if similar-sized earthquakes were triggered in formations intended to sequester CO2 for hundreds to thousands of years." A separate study by the U.S. National Research Council on Friday found that CCS "may have potential for inducing larger seismic events," while the earthquake potential from hydraulic fracturing was low. CCS was singled out because proposed projects would involve injecting the largest volumes of fluids below the surface for long periods — more than in fracking or traditional oil and gas operations — and therefore may cause bigger earthquakes, it said. However, there are no major CCS projects under way so the actual risk is difficult to assess and more research is needed, the NRC report said.

### XT: Storage Facilities Damage

#### Earthquakes risk damaging storage facilities

**Zoback and Gorelick 5/4/12**

[[Mark D. Zoback Professor at the Department of Geophysics at Stanford University, and Steven M. Gorelick Professor of Environmental Earth System Sciences at Stanford University, “Earthquake triggering and large-scale geological storage of carbon dioxide” Found on the Proceedings of the National Academy of Sciences, May 4th, 2012 /SM]

Our principal concern is not that injection associated with CCS projects is likely to trigger large earthquakes; the problem is that even small to moderate earthquakes threaten the seal integrity of a CO2 repository. In parts of the world with good construction practices, it is unusual for earthquakes smaller than approximately M 6 to cause significant human harm or property damage. Fig. 2 uses wellestablished seismological relationships to show how the magnitude of an earthquake is related to the size of the fault that slipped and the amount of fault slip that occurred (16). As shown, faults capable of producing M ∼6 earthquakes are at least tens of kilometers in extent. (The fault size indicated along the abscissa is a lower bound of fault size as it refers to the size of the fault segment that slips in a given earthquake. The fault on which an earthquake occurs is larger than the part of the fault that slips in an individual event.) In most cases, such faults should be easily identified during geophysical site characterization studies and thus should be avoided at any site chosen for a CO2 repository. (Faults in crystalline basement rocks might be difficult to recognize in geophysical data. We assume, however, that any site chosen as a potential CO2 repository would be carefully selected, avoiding the possibility of pressure changes in the CO2 repository from affecting faults in crystalline basement.) The problem is that site characterization studies can easily miss the much smaller faults associated with small to moderate earthquakes. Although the ground shaking from small- to moderate-sized earthquakes is inconsequential, their impact on a CO2 repository would not be. Most of the geologic formations to be used for longterm storage of CO2 are likely to be at depths of approximately 2 km—deep enough for there to be adequate sealing formations to isolate the CO2 from the biosphere but not so deep as to encounter formations with very low permeability. Given large volumes of CO2 injected into selected formations for many decades, if a small to moderate earthquake were to be triggered in a geologic formation at approximately 2 km depth, it could jeopardize the seal integrity of the storage formation

## Politics

### Politics – Spending Link

#### Significant opposition to new spending on CCS

Weiss 10 - Senior Fellow and the Director of Climate Strategy at American Progress

Daniel, “Efforts to Save Coal Could End Up Destroying It,” Center for American Progress, http://www.americanprogress.org/issues/2010/09/coal\_senators.html

Second, without a pollution reduction program to generate revenue to invest in CCS research and development, some of the money for it will have to come from general revenues. The large federal budget deficit, however, has fueled opposition to more government spending. APA and the American Clean Energy and Security Act, H.R. 2454, would have provided billions of dollars for CCS research using revenue raised from selling pollution dumping permits under global warming pollution reduction legislation. It is difficult to imagine Congress appropriating money for CCS when so many existing programs will be facing severe budget cuts.

#### Costs lead to political backlash

Parfomak and Folger 08Parfomak: Specialist in Energy and Infrastructure Policy, Folger: Specialist in Energy and Natural Resources Policy (Paul W. Parfomak, Peter Folger, January 17, 2008, “Carbon Dioxide (CO2) Pipelines for Carbon Sequestration: Emerging Policy Issues,” [http://www.marstonlaw.com/index\_files/Emerging%20Policy%20issues%20for%20CO2%20pipelines%202008%20CORRECTED%20(2008-01-17%20(No%20RL33971).pdf)](http://www.marstonlaw.com/index_files/Emerging%20Policy%20issues%20for%20CO2%20pipelines%202008%20CORRECTED%20%282008-01-17%20%28No%20RL33971%29.pdf%29)//DR. H

Pipeline Costs

If an extensive network of pipelines is required for CO2 transportation, pipeline costs may be a major consideration in CCS policy. MIT estimated overall annualized pipeline transportation (and storage) costs of approximately $5 per metric ton of CO2.46 If CO2 sequestration rates in the United States were on the order of 1 billion metric tons per year at mid-century, as some analysts propose, annualized pipeline costs would run into the billions of dollars. Furthermore, because most pipeline costs are initial capital costs, up-front capital outlays for a new CO2 pipeline network would be enormous. The 2007 Duke study, for example, estimated it would cost approximately $5 billion to construct a CO2 trunk line along existing pipeline rights of way to transport captured CO2 from North Carolina to potential sequestration sites in the Gulf states and Appalachia.47 Within the context of overall CO2 pipeline costs, several specific cost-related issues may warrant further examination by Congress. Materials Costs.Analysts commonly develop cost estimates for CO2 pipelines based on comparable construction costs for natural gas pipelines, and to a lesser extent, petroleum product pipelines. In most cases, these comparisons appear appropriate since CO2 pipelines are similar in design and operation to other pipelines, especially natural gas pipelines. A University of California (UC) study analyzing the costs of U.S. transmission pipelines constructed between 1991 and 2003 found that, on average, labor accounted for approximately 45% of the total construction costs. Materials, rights of way, and miscellaneous costs accounted for 26%, 22%, and 7% of total costs, respectively.48 Materials cost was most closely dependent upon pipeline size, accounting for an increasing fraction of the total cost with increasing pipeline size, from 15% to 35% of total costs. The MIT study estimated that transportation of captured CO2 from a 1 gigawatt coal-fired power plant would require a pipe diameter of 16 inches.49 According to the UC analysis, total construction costs for such a pipe between 1991 and 2003 averaged around $800,000 per mile (in 2002 dollars), although the study stated that costs for any individual pipeline could vary by a factor of five depending its location.50 **[table omitted by Dillon hall]** Since pipeline materials make up a significant portion of CO2 pipeline construction costs, analysts have called attention to rising pipeline materials costs, especially steel costs, as a concern for policymakers.51 Following a period of low steel prices and company bankruptcies earlier in the decade, the North American steel industry has returned to profitability and enjoys strong domestic and global demand.52 Now, higher prices resulting from both strong demand and increased production costs for carbon steel plate, used in making large-diameter pipe, may alter the basic economics of CO2 pipeline projects and CCS schemes overall. As **Figure 2** shows, **the price of large-diameter pipe was generally around $600** per ton in late 2001 and early 2002. By late 2007, the price of pipe was approaching $1,400 per ton. Analysts forecast carbon steel prices to decline over the next two years, but only gradually, and to a level still more than double the price early in the decade.53

### Politics Link – CCS Controversy

#### It’s a political lightning rod—even environmentalists are wary

Luoma 11 – author of three books on environmental issues and a contributing editor at Audubon (Jon, “Are Carbon Sequestration Leaks a Potential Health Danger?” Popular Mechanics September 13 2011 <http://www.popularmechanics.com/science/environment/climate-change/are-carbon-sequestration-leaks-a-health-danger>) MLR

Still, **CCS remains a** lightning rod**.** Roberts and colleagues wrote in their study that CCS must be part of a plan to prevent many millions of tons of from "contributing to a [climate change] process which will have catastrophic effects on human lives across the globe." However, **even some environmentalists are opposed to the idea, the argument being that just burying carbon dioxide does nothing to ease the reliance on fossil fuels. Plus, it’s not clear whether studies** like this one **will reassure those wary of CO2 leaks.**

### Politics Link – Environmentalists

#### Plan angers environmentalists

Hester 09(Tom Hester Sr., October 15, 2009, “New Jersey’s environmentalists form alliance to oppose planned mega coal plant in Linden,” [http://www.newjerseynewsroom.com/science-updates/new-jerseys-environmentalists-form-alliance-to-oppose-planned-mega-coal-plant-in-linden)//DR](http://www.newjerseynewsroom.com/science-updates/new-jerseys-environmentalists-form-alliance-to-oppose-planned-mega-coal-plant-in-linden%29//DR). H

A coalition of environmentalists announced Thursday that they have formed the Arthur Kill Watershed Alliance with the goal of fighting a proposed null coal plant in Linden**.** Members of the new Arthur Kill Watershed Alliance include the Tremley Point Alliance, the New Jersey Sierra Club, the Edison Wetlands Association, the New Jersey Environmental Federation, the New Jersey Environmental Lobby and Environment New Jersey. Linden City Council President Robert Bunk joined alliance leaders at a press conference at City Hall to announce his opposition to the proposal, a 500 megawatt coal plant and carbon capture and sequestration pilot project that environmentalists maintain will threaten the health of the area's residents and pollute the environment. The environmentalists insist the $5 billion pilot project, called PurGen, would "severely degrade'' the local environment and undermine Linden's revitalization effort. They argue that reliance on untested sequestration technology could jeopardize the state's attempts to help mitigate global warming. Carbon capture and sequestration is an unproven and untested technology, according to the environmentalists. PurGen theorizes it can capture and liquefy carbon dioxide and push it 70 miles through an offshore pipeline to be buried under the seabed. The proposed location for plant is the former DuPont site along the Arthur Kill. The pipeline would run under Raritan Bay through the ocean to the shores off Atlantic City, where the carbon dioxide discharge site will be located in ocean rock deposits**.**

#### Environmentalists are key to the Agenda

Williams 08Doctorate and Masters in Economics, Distinguished Professor of Economics, More than 50 of his publications have appeared in scholarly journals, Received the National Fellow at the Hoover Institute of War, Revolution, and Peace; the Ford Foundation Dissertation Fellowship; the National Service Award from the Institute for Socioeconomic Studies; and the George Washington Medal of Honor from the Valley Forge Freedom Foundation. In 1984-1985, he received the Faculty Member of the Year Award from the George Mason University Alumni. He is also a member of the American Economic Association, the Mont Pelerin Society and is a Distinguished Scholar of the Heritage Foundation, participates in many debates and conferences, is a frequent public speaker and often gives testimony before both houses of Congress (Walter, July 30, 2008, “Environmentalists' Hold on Congress,” [http://townhall.com/columnists/walterewilliams/2008/07/30/environmentalists\_hold\_on\_congress/page/full/)//DR](http://townhall.com/columnists/walterewilliams/2008/07/30/environmentalists_hold_on_congress/page/full/%29//DR). H

Let's face it. **The average individual American has little or no clout with Congress** and can be safely ignored. But **it's a different story with groups such as Environmental Defense Fund, Sierra Club and The Nature Conservancy. When they speak, Congress listens.** Unlike the average American, **they are well organized, loaded with cash and well positioned to be a disobedient congressman's worse nightmare. Their political and economic success has been a near disaster for our nation.**

For several decades, **environmentalists have managed to get Congress to keep most of our oil resources off-limits to exploration and drilling. They've managed to have the Congress enact onerous regulations that have made refinery construction impossible**. Similarly, **they've used the courts and Congress to completely stymie the construction of nuclear power plants.** As a result, energy prices are at historical highs and threaten our economy and national security.

**What's the political response to our energy problems? It's more congressional and White House kowtowing to environmentalists, farmers and multi-billion dollar corporations such as Archer Daniels Midland.** Their "solution," rather than to solve our oil supply problem by permitting drilling for the billions upon billions of barrels of oil beneath the surface of our country, is to enact the Energy Independence and Security Act of 2007 that mandates that oil companies increase the amount of ethanol mixed with gasoline. Anyone with an ounce of brains would have realized that diverting crops from food to fuel use would raise the prices of corn-fed livestock, such as pork, beef, chicken and dairy products, and products made from corn, such as cereals. Ethanol production has led to increases in other grain prices, such as soybean and wheat. Since the U.S. is the world's largest grain producer and exporter, higher grain prices have had a huge impact on food prices worldwide.

**Congress and the environmentalists aren't through with us.** If you're bothered by skyrocketing food and energy prices, **wait until Congress re-introduces its environmentalist-inspired Climate Security Act, so-called "Cap and Trade**." Cap and Trade is deceptively peddled as a free-market solution to the yet-to-be-settled issue of manmade climate change. Under its provisions, companies would be able to emit greenhouse gases only if they had a government allowance. The Congressional Budget Office estimates that a 15 percent cut in emissions would raise the annual average household's energy costs by $1,300. Since energy is an input to everything we use, we can expect everything to become more costly, resulting in a reduction in economic growth.

There's a hateful side to Cap and Trade that's revealed by asking the question: How will it be decided who received how much allowance to emit greenhouse gases? **Congress could sell the allowances and/or give them away to favorite constituents. You can bet the rent money that a new army of lobbyists, with special pleadings, will descend on Washington to lobby Congress. And you can be sure that campaign contributions and favoritism will play an important role in the decision of who received what amount of allowances.**

Much worse than that is the massive control government would have over our economy and our lives. Congress might decide that since tobacco use is unhealthy, it might not issue allowances to tobacco companies. While many Americans might applaud that, how many would like Congress to refuse to issue allowances to companies that produce foods that some people deem unhealthy such as French fries, sodas, canned soups and potato chips. Congress might deny, or threaten to deny, allowances to companies that in their opinion didn't hire enough women and minorities. The possibilities for control over our lives would be endless and could include nuisance-type edicts such a requiring us to buy a permit to barbeque in our backyard.

**The thirst to wield massive control over our economy helps explain the near religious belief in manmade global warming and the attacks on scientists and others who offer contradictory evidence.**

#### Environmentalists are key to the agenda

Loris 08Policy Analyst for Heritage, Studies energy, environment and regulation issues such as the economic impacts of climate change legislation(Nicolas Loris, August 4, 2008, “When Environmentalists Speak, Congress Listens,” The Foundry, [http://blog.heritage.org/2008/08/04/when-environmentalists-speak-congress-listens/)//DR](http://blog.heritage.org/2008/08/04/when-environmentalists-speak-congress-listens/%29//DR). H

**The problem with environmental extremists is that they are not really pro-environment, they’re anti-energy and anti-progress, and for years these groups have been some of the most influential people in U.S. policy circles.** Walter Williams reminds us that **they “are well organized, loaded with cash and well positioned to be a disobedient congressman’s worse nightmare. Their political and economic success has been a near disaster for our nation.”**

As Dr. Williams explains, two energy sources that we could have readily available today if not for the environmentalist movement is oil from offshore and federally restricted lands and more nuclear power.

When gas prices were near $1 a gallon around the year 2000, it was easier for Members of Congress to listen to environmental activists’ pleas to restrict domestic land that has approximately 30 years’ worth of imports from Saudi Arabia and enough natural gas to power America’s homes for 17 years. **Even as prices continued to escalate, the environmentalists worked Congress over to keep the restrictions in place.** And here we are today, with the national price of gas at $4 a gallon, and Nancy Pelosi is still shutting the door on the drilling debate.

**The second major source of power that environmentalists have stymied is nuclear power.** Although 104 reactors provide 20% of the nation’s electricity, it could have been much more. Heritage Research Fellow Jack Spencer writes,

Anti-nuclear groups used both legal intervention and civil disobedience to impede construction of new nuclear power plants and hamper the opera­tions of existing units. They legally challenged 73 percent of the nuclear license applications filed between 1970 and 1972 and formed a group called Consolidated National Interveners for the specific purpose of disrupting hearings of the Atomic Energy Commission. Today, **activist organizations determined to force the closure of nuclear power plants**, such as Mothers for Peace, **continue to use the legal process to harass the nuclear energy industry.”**

To make matters worse, **Members are using the tried and failed policies of the past to make amends for conceding to the environmentalists. Then there’s the cap-and trade legislation that has been proposed to combat global warming where companies would receive allowances to emit carbon dioxide and other greenhouse gases.** While it’s often marketed as the free market solution to global warming, Dr. Williams illustrates how it could be one of the largest command and control policies of our time:

**Much worse than that is the massive control government would have over our economy and our lives. Congress might decide that since tobacco use is unhealthy, it might not issue allowances to tobacco companies.** While many Americans might applaud that, **how many would like Congress to refuse to issue allowances to companies that produce foods that some people deem unhealthy such as French fries, sodas, canned soups and potato chips. Congress might deny**, or threaten to deny, **allowances to companies that in their opinion didn’t hire enough women and minorities. The possibilities for control over our lives would be endless and could include nuisance-type edicts such a requiring us to buy a permit to barbeque in our backyard.”**

### Politics Link – Public

#### Public opposes

Stephenson 8 - Director, Natural Resources and Environment @ GAO

“Federal Actions Will Greatly Affect the Viability of Carbon Capture and Storage As a Key Mitigation Option,” GAO, http://www.gao.gov/new.items/d081080.pdf

Thus far at least, there has been little public opposition to the CO2 injections that have taken place in states such as Texas to enhance oil recovery. However, several notable studies explain that this lack of publicly-expressed concern may reflect more a lack of knowledge about CCS rather than confidence that the process is safe. 56 This is suggested in the IPCC’s 2005 report on CCS which stated, for example, that there is insufficient public knowledge of climate change issues and of the various mitigation options and their potential impact. In another 2005 study, researchers surveyed 1,200 people, representing a general population sample of the United States, and found that that less than 4 percent of the respondents were familiar with the terms carbon dioxide capture and storage or carbon storage. Some of the stakeholders we interviewed explained that public opposition could indeed grow when CCS extends beyond the relatively small projects used to enhance oil and gas recovery, to include much larger CO2 sequestration projects located in more populated areas. One noted, in particular, that a lack of education about CCS’s safety could potentially create confusion and fear when commercial-scale CCS is implemented.

#### Plan faces public opposition

Amann 10Scholarly Group of Environmental and Energy Experts (Rachel Amann, December 31, 2010, “A Policy, Legal, and Regulatory Evaluation of the Feasibility of a National Pipeline Infrastructure for the Transport and Storage of Carbon Dioxide: Interstate Oil and Gas Compact Commission,” [http://www.sseb.org/downloads/pipeline.pdf)//DR](http://www.sseb.org/downloads/pipeline.pdf%29//DR). H

In addition to the purity issue and the EPA actions on CO2, there also are political issues associated with the development of the CO2 infrastructure. Whether CO2 is treated as a commodity, pollutant, or transport resource to be managed, the likelihood of public opposition to pipeline transport is high, just as with other resource infrastructure.

#### Major public opposition

Watson 4/19 Director of the Sussex Energy Group at the University of Sussex (Jim Watson, April 19, 2012, “Carbon Capture and Storage: What can the government do?” [http://www.epolitix.com/latestnews/article-detail/newsarticle/carbon-capture-and-storage-what-can-the-government-do/)//DR](http://www.epolitix.com/latestnews/article-detail/newsarticle/carbon-capture-and-storage-what-can-the-government-do/%29//DR). H

In Germany and the Netherlands, **the plan was to have storage of CO2 under land rather than offshore under the sea bed. Because this is under land, people will naturally start to worry if developers intend to inject CO2 under a certain site.** It doesn’t mean to say that these worries are scientifically founded, but **such concerns are an unavoidable fact of many energy infrastructure developments.**

**That has been the major reason for public opposition in those countries. I also detect a fundamental scepticism**, in countries such as Germany, **about this idea of capturing CO2 from fossil fuel power plants. There is much bigger public support for the idea of moving away from fossil fuels and towards renewables and energy efficiency. My sense is that some of that is also behind the opposition.**

The hope for industry in the UK is that by doing offshore storage, they will avoid some of that. However, I don’t think there is any guarantee**. Once they start developing actual plants, I wouldn’t be surprised if there was some local opposition to CO2 pipelines** for example.

### Politics Link Turns Case

#### Link turns case – public backlash prevents CCS success

Stephenson 8 - Director, Natural Resources and Environment @ GAO

“Federal Actions Will Greatly Affect the Viability of Carbon Capture and Storage As a Key Mitigation Option,” GAO, http://www.gao.gov/new.items/d081080.pdf

Citing such concerns, a recent report by the National Academy of Sciences underscored the importance of public outreach, noting that while the success of DOE’s carbon capture program depends heavily on its ability to reduce the cost of the technology, “the storage program cannot be successful if a significant fraction of the public views it as dangerous or unacceptable. Thus, the technologies must not only be safe and effective, they must be explainable to the public and the regulatory community in such a way as to instill confidence that they are in fact safe and effective.” 57 The report went on to caution that “the federal government in general and the DOE in particular have not had a good track record in accomplishing this task in other programs.” For its part, EPA received similar advice from its Clean Air Act Advisory Committee’s Advanced Coal Technology Work Group. The Work Group’s January 2008 report recommended that the agency immediately develop, in consultation with other agencies, a public outreach effort to explain carbon capture and sequestration. 58 A diverse group of panel members at EPA’s 2007 UIC workshop made similar recommendations for public outreach and participation.

## Steel

### Link

#### Pipelines compete with steel

EPA 10

“Report of the Interagency Task Force on Carbon Capture and Storage,” http://www.epa.gov/climatechange/downloads/CCS-Task-Force-Report-2010.pdf

Modeling of the ACES Act of 2009 projects that by 2020 and 2030, approximately 180 and 480 million tonnes, respectively, would be captured, transported, and securely sequestered in deep geologic formations. These quantities of CO2 represent between 4 and 10 times the amount of CO2 transported in the United States in 2009, resulting in a need to construct new pipelines. Separate studies completed by the Interstate Natural Gas Association of America (INGAA) and the Pacific Northwest National Laboratory (PNNL) looked at the amount of infrastructure necessary to support future CCS deployment (Dooley et al., 2008; The INGAA Foundation, 2009). 46 The estimated length of pipelines needed for commercial deployment of CCS ranged from 5,000 to 13,000 miles in 2020 and from 22,000 to 36,000 miles through 2030. Between 1998 and 2007 the natural gas industry built 20,829 miles of pipelines in the United States (EIA, 2008). While expected construction rates seem reasonable, CO2 pipeline development will compete for resources, training needs, and additional draws on quantities of available commodities such as steel.

### Link – Turns Case

#### Trades off with steel – also takes out the case – makes widespread implementation less likely

Parfomak et al 9 – Specialist in Energy and Infrastructure @ CRS

Paul, “Carbon Dioxide (CO2) Pipelines for Carbon Sequestration: Emerging Policy Issues,” Scholar

If some form of CCS is effectively mandated in the future, a surge in demand for new CO2 pipe, in competition with demand for natural gas and oil pipelines, may exacerbate the trend of rising prices for pipeline materials, and could even lead to shortages of pipe steel from North American sources. As a consequence, the availability and cost of pipeline steel to build such a CO2 pipeline network for CCS may be a limiting factor for widespread CCS implementation.

## Case Debate

### Econ Turns Case

#### Economic decline turns the case – prevents broader investment in CCS

Handwerk 12 – National Geographic Analyst

Brian, “Amid Economic Concerns, Carbon Capture Faces a Hazy Future,” http://news.nationalgeographic.com/news/energy/2012/05/120522-carbon-capture-and-storage-economic-hurdles/

For a world dependent on fossil fuels, carbon capture and storage (CCS) could be a key to controlling greenhouse gas emissions. But the technology meant to scrub carbon dioxide pollution from the air is experiencing stiff headwinds that have stalled many projects at the bottom line.t Many companies have determined that expensive CCS operations simply aren't worth the investment without government mandates or revenue from carbon prices set far higher than those currently found at the main operational market, the European Trading System, or other fledgling markets. According to a recent Worldwatch Institute report, only eight large-scale, fully integrated CCS projects are actually operational, and that number has not increased in three years. "In fact, from 2010 to 2011, the number of large-scale CCS plants operating, under construction, or being planned declined," said Matt Lucky, the report's author. Numerous projects in Europe and North America are being scrapped altogether, Lucky added. Last month, TransAlta, the Canadian electricity giant, abandoned plans for a CCS facility at an Alberta coal-burning plant because financial incentives were too weak to justify costly investment in CCS. "For a very small industry that's still in the developmental state, it's not a good sign when the number of planned projects is declining," Lucky said. "This is a period when it should be exploding, so this doesn't signal significant growth of the CCS industry in the near future." Low-Cost Carbon Killing Investment Carbon capture and storage could reduce greenhouse gas emissions by capturing CO2 where it's produced and storing it permanently in various types of underground geological reservoirs. The International Energy Agency (IEA) believes CCS technology can dramatically reduce greenhouse gas emissions when implemented at dirty fossil fuel power plants and other industrial facilities that enlarge the world's CO2 footprint. The IEA would like to see more than 3,000 CCS-equipped plants come online by mid-century to achieve 20 percent of planned reductions in CO2 emissions. But no large-scale projects currently operate at power plants, and Howard Herzog, a CCS expert at Massachusetts Institute of Technology (MIT), said efforts to scale up the industry are largely on hold. "I'd say the biggest problem we have right now is that there is not a market for CCS because there is no climate policy," Herzog said. "This technology can effectively help lower CO2 emissions in the atmosphere but that will always cost more than letting business as usual go on. So as long as there is no policy to stop business as usual, it will go on." The United States has failed to enact a climate policy. And other nations, in turn, have not reached a strong international agreement on mandatory carbon emissions reductions without the largest historic polluter at the negotiating table. As a result, the envisioned market-based solution, where companies could gain valuable "credits" for steps they would take to reduce emissions while others would face new costs for failure to act, has never gained traction. CCS is so costly that such an incentive system is necessary for its development. Herzog pointed to the American Electric Power Mountaineer coal power plant project in New Haven, West Virginia, where carbon produced at a coal plant was to be sequestered deep in Mount Simon sandstone. The U.S. Department of Energy was slated to fund half of the project's costs, up to $334 million, but after a successful pilot project, AEP canceled Phase 2 CCS at the site last summer. The decision was attributed to a weak economy and an uncertain U.S. policy on climate and carbon.

### Status Quo Solves

#### Status quo solves

Speight 8– professor at the University of Trinidad and Tobago, former chief scientific officer at the Western Research Institute, (James G., “Synthetic Fuels Handbook”, Lexis)//JK

According to BP Statistical Review of World Energy 2006 figures [5], global consumption of coal grew from 2,282 Mtoe in 1995 to 2,930 Mtoe in 2005, an annual growth rate of 2.6%. The top five coal consumers in 2005 were China (36.9% of global coal consumption), the United States (19.6%), India (7.3%), Japan (4.1%), Russia (3.8%) (Figure 2). Coal is the major fuel used for generating electricity worldwide. Almost 40% of global electricity generation is currently based on coal [14]. Table 2 shows coal’s share of total electricity generation in some countries [15 and 16]. The generation technologies are well established and technical capacity and human expertise is widespread. Ongoing research efforts around the globe ensure that this capacity is continually being improved and expanded, facilitating innovation in energy efficiency and constantly improving environmental performance [17]. In 2030, coal covers 45% of world power needs. In developing countries, coal covers 33% of primary energy demand and 53% of electricity generation; creates jobs, develops skills and 72% of world coal-based electricity generation expected to be with clean coal technologies in 2030 [3].

### No Solvency – Private Sector

#### No company or lender is willing to invest in CCS – even after regulations

Johnson 6-11

Steve, “Co-op Rep: EPA Off Base on Carbon,” http://www.ect.coop/public-policy-watch/energy-environment/electric-cooperative-epa-carbo-reduction-rule/45194

A Mid-Atlantic G&T official told a congressional panel that a federal carbon reduction standard impairs the plans of his cooperative and other electric utilities for future baseload generation. David Hudgins said the Environmental Protection Agency has failed to state a clear benefit to its proposed limits on greenhouse gases at new fossil-fuel plants and wrongly assumes that utilities can rely on unproven carbon capture and storage technology to meet them. “No company will take the risk to invest billions of dollars into a power plant in the hopes that CCS technology will be developed,” said Hudgins, director of member and external relations at Old Dominion Electric Cooperative. “Additionally, financial lending institutions will not lend money to construct a plant without a viable technology to demonstrate compliance,” he said. Hudgins testified June 6 at a House Subcommittee on Energy and Environment hearing on environmental regulations, with an emphasis on the costs and benefits of EPA’s new source performance standards for new fossil-fuel power plants. That’s a major matter of concern for Glen Allen, Va.-based ODEC, which serves 11 distribution co-ops in three states. To meet growing demand, it is planning a $5 billion, state-of-the-art baseload plant in southeast Virginia that uses coal and renewable biomass. ODEC has been working on carbon sequestration research, but Hudgins said the technology is unlikely to be commercially viable within a decade, as the agency insists.

#### Private sector will say no prior to carbon limits

EPA 10

“Report of the Interagency Task Force on Carbon Capture and Storage,” http://www.epa.gov/climatechange/downloads/CCS-Task-Force-Report-2010.pdf

A CCS project can support a loan (and a loan guarantee) only if it creates a consistent cash flow stream with which to service the debt. For this reason, pre-commercial projects with uncertain performance projections are typically better candidates for grant funding than for loan guarantees. Moreover, the current field of candidate projects for loan guarantees is relatively limited by the inability of CCS projects to rely on cash flow from CO2 abatement prior to enactment of a policy to create a carbon market. Establishment of a domestic carbon price could markedly improve the financial profile of CCS projects. The foundation for a candidate project’s creditworthiness requires, among other things, sound supply agreements, product sales agreements, reliable operations, and a high level of maintenance of the production facility. Therefore, projects under consideration to date rely on low-risk capture and sequestration methods based on commercial technology, such as pre-combustion capture techniques with beneficial reuse of the CO2 produced.

### No Solvency – Cost

#### It’s cost prohibitive and raises safety concerns

Romm 10– Senior Fellow at American Progress and Ph.D. in physics from MIT (Joe, “New study finds geologic sequestration ‘is not a practical means to provide any substantive reduction in CO2 emissions’” Center for American Progress April 27 2010 <http://thinkprogress.org/climate/2010/04/27/205870/ccs-stunner-new-study-finds-geologic-sequestration-is-not-a-practical-means-to-provide-any-substantive-reduction-in-co2-emissions/>) MLR

The fact is that the concerns laid out in the new study are not new ones. Indeed, my 2008 post quoted a BusinessWeek piece, “The Dirty Truth About Clean Coal“: The method is widely viewed as being decades away from commercial viability. Even then, the cost could be prohibitive: by a conservative estimate, several trillion dollars to switch to clean coal in the U.S. alone. Then there are the safety questions. One large, coal-fired plant generates the equivalent of 3 billion barrels of CO2 over a 60-year lifetime. That would require a space the size of a major oil field to contain. The pressure could cause leaks or earthquakes, says Curt M. White, who ran the U.S. Energy Dept.’s carbon sequestration group until 2005 and served as an adviser until earlier this year. “Red flags should be going up everywhere when you talk about this amount of liquid being put underground.”

**CCS costs prevent solvency**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**CCS is too expensive**

Cost estimates for CCS vary considerably depending on factors such as power station configuration, CCS technology, fuel costs, size of project and location. One thing is certain, **CCS** is expensive. It **requires significant funds to construct the power stations and necessary infrastructure to transport and store carbon.** The IPCC sets costs between US$15-75 per ton of captured CO2.127 A recent US DOE report found installing carbon capture systems to most modern plant technologies resulted in a near doubling of plant costs.128 **Such costs are estimated to increase the price of electricity anywhere from 21-91%.**129

For transport, pipeline networks will need to be built to move CO2 to storage sites. **The construction of a network of pipelines for CCS is likely to require a considerable outlay of capital.**130 **Costs will vary depending on a number of factors, including pipeline length, diameter and specific steel components** (corrosion-resistant) **as well as the volume of CO2 to be transported. Pipelines built near population** centres or on difficult terrain (such as marshy or rocky ground) **are more expensive.**131 The IPCC estimates a cost range for pipelines between US$1-8/ton of CO2 transported (see Table 5).132 A United States Congressional Research Services report calculated capital costs for an 11-mile (18 km) pipeline in the midwestern part of the country at approximately US$6 million. The same report estimates that a dedicated interstate pipeline network in North Carolina would cost upwards of US$5 billion due to the limited geological sequestration potential in that part of the country.133

Storage and subsequent monitoring and verification costs are estimated to range from US$0.5-8/tCO2 injected and US$0.1-0.3/tCO2 injected, respectively.134 **The overall cost of CCS could serve as another barrier to its deployment.**135 EOR has been suggested as a way to offset the costs but as “Oil fails to pay for CCS” (page 28) shows, in reality this is questionable.136

**Too expensive**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**Even if CCS were available, large applications are prohibitively expensive.** EOR is often proposed as a way round this. Its proponents argue that the profits from the recovered oil will cover the costs of carbon capture.

However, **not only are EOR sites too few and far between to accomodate much carbon from widespread CCS operations,**1 **the cancellation of CCSEOR projects due to associated costs and low returns show it is not always able to offset the extra costs.** In 2005, when production in the British Miller oil and gas field became uneconomic, BP sought government subsidies to initiate an EOR project. With EOR the life of the oil field could have been extended by up to 20 years, delaying the costly decommissioning process and allowing access to an estimated 57 million barrels of currently unrecoverable oil.2

**The potential profits from the recovered oil, however, could not make up the difference between the cost of carbon using CCS** (€38 per tonne), **and the current price of carbon credits** (€21 per tonne, in the EU).3

BP tried to convince the UK government to bridge the gap, asking for a tax break of over 50%, and a guaranteed subsidised rate of return. When the UK government decided that all proposed CCS projects had to compete for funding and tax relief, BP cancelled its plans.

The Norwegian government abandoned a similar project after the Statoil-Hydro and Shell companies withdrew. The companies argued that although CCS would probably be technically feasible, it would never make economic sense. Building the CCS technology would have meant closing oil production for a year, and completely modifying the facilities.

Overall, **oil production would only have increased by 2%4 nowhere near enough to cover the costs of installing the CCS technology. EOR is one of the main ways proposed by industry to make CCS affordable, yet** as the above cases highlight, **projects are often unlikely to be able to cover the costs. Funding CCS is an extremely unwise investment.**

**Plan costs way too much—renewables are comparatively better**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**Financial risks**

**Immense amounts of money have already been spent supporting fossil-fuel power plants that are the main contributors to climate change. Implementation of CCS would require** governments not only **to** continue but **augment this support with additional subsidies and policy drivers. CCS adoption will only be possible with extremely heavy incentives. The technology is very expensive, and there are no guarantees that it will ever work.** Economic analysis of absolute costs for CCS is characterised by a high level of uncertainty. For power stations, the IPCC estimates a range of US$14 to $91 per tonne of CO2 avoided for the entire CCS process.160 A more recent assessment placed the cost of merely capturing the CO2 anywhere from €24-75 per tonne CO2 avoided.161

Carbon emission cap-and-trade schemes have been promoted by CCS supporters as a way to lower the cost barriers of technology adoption.162 However, **in order for CCS to be profitable, the price for carbon emissions would have to be even higher than the additional costs associated with deploying the technology.** Current CO2 market prices of around €21 per tonne as well as future projections for the 2008-2012 period of the Emissions Trading Scheme are insufficient to spur deployment of CCS.163 Prices as high as €100 per tonne might be needed to support initial projects.164 However, **not even a high price on carbon is enough to ensure a future for CCS.**165

**To make projects viable**, however, **carbon prices would need to be coupled with additional policy commitments and financial incentives.**166 Additional mechanisms proposed to supplement carbon prices include direct investment support, loan guarantees and public-private partnerships.167 Instead of polluters being asked to pay for these programmes, deployment of CCS envisages a scheme where governments, and ultimately taxpayers, pay polluters to try not to pollute. **If costs turn out to be higher than expected, the conditions for commercial viability may never be met and the money spent will have been wasted.**

**Providing the substantial levels of support to get CCS off the ground raises a serious question about priorities when current research shows that electricity generated from coal equipped with CCS will be more expensive than other less polluting sources**, such as gas, wind power and many types of sustainable biomass. **It is also much more expensive than increasing energy efficiency.**168 Even assuming that, at some stage, **carbon capture becomes technically feasible, capable of long-term storage, environmentally safe and commercially viable, its impact would be limited and come at a high cost.**

Meanwhile, as Greenpeace’s Futu[r]e Investment report169 shows, **investing in a renewable energy future would save US$180 billion annually and cut CO2 emissions in half by 2050.**

### No Solvency – No Tech / Slow

#### No technology for carbon capture – optimistic evidence points to still over 2 decades away

Hamilton 10 – Professor of Public Ethics @ ANU

Clive Hamilton, Professor of Public Ethics in Australia, 2010, “Requiem for a Species: Why We Resist the Truth About Climate Change,” pg 162

As soon as one begins to investigate the issue, one is struck by the yawning gap between the deadlines for action provided by the climate scientists and the time lapse before the technology can deliver. While climate scientists say we must begin to radically reduce emissions in rich countries inside a decade, the best estimates for 'clean coal' indicate it will not be ready for widespread adoption for at least two decades. Independent analysis suggests that full-scale commercial implementation of carbon capture and storage will not occur until 2030 In Australia, economic modelling by the Treasury assumes that 'clean coal' technology will not begin reducing emissions from coal-fired power plants until 2026 at the earliest and more likely 2033.' Yet the International Energy Agency (IEA), long seen to be the captive of the traditional energy industries, estimates that by 2030 the world will need more than 200 power plants fully equipped with CCS if warming is to be limited to 3°C. Three degrees! The IPCC estimates that by 2050 only 30-60 per cent of power generation will be technically suitable for carbon capture and storage, and the IEA's projections show the technology will deliver less than 20 per cent of the emission reductions needed by 2050 in order to stabilise concentrations close to 450 ppm.

#### Prefer our evidence – theirs is unsupported optimism

Johnson et al. 10 – PhD in Atmospheric Science

Andrew Simms, policy director of New Economics Foundation, UK think tank, and head of NEF's Climate Change Programme, Dr. Victoria Johnson, researcher for the climate change and energy programme at NEF, MSc with distinction in Climate Change from the University of East Anglia and PhD in Atmospheric Physics at Imperial College, London and Peter Chowla, Policy and Advocacy Officer at the Bretton Woods Project. “Growth isn’t possible”. New Economics Foundation, January 25,2010. http://www.neweconomics.org/sites/neweconomics.org/files/Growth\_Isnt\_Possible.pdf

There are three fundamental critiques of these scenarios, however. First, it is noteworthy that recent research by Lowe et al. has stated that in order to have less than a 50 per cent change of not exceeding 2°C, emissions need to peak by 2015 and fall by 3 per cent each year thereafter. Neither the RS nor the AP scenarios achieve such an early and dramatic peak and decline scenario. Lowe et al. also note that even if emissions peak in 2015, there is still a one-in-three chance that near-surface temperatures will rise by more than 2°C in 100 years’ time.193 The IEA, however, dismisses a scenario that does not achieve overshoot stating: ‘A 450 stabilisation trajectory without overshoot would need to achieve substantially lower emissions in the period up to 2020 and, realistically, this could be done only by scrapping very substantial amounts of existing capital across all energy-related industries. In any case, given the scale of new investment required, it is unlikely that the necessary new equipment and infrastructure could be built and deployed quickly enough to meet demand.’194 Wigley et al. also note that a policy that allows emissions to follow an overshoot pathway means that in order to recover to lower temperatures within a century timescale, we may, for a period, require negative global emissions of CO2.195 Second, the assumptions about growth in capacity of CCS are also overly optimistic. The consensus view is that CCS may be commercially viable by 2020; however, a number of analysts believe even this is an optimistic scenario suggesting that 2030 may be more realistic. Third, given the optimism attached to CCS as a viable technology in the near future, the assumption that CO2 intensity can feasibly decline by 2.6 per cent per year can also be viewed as over optimistic. Figure 5 produced by Pielke et al. compares predicted (IPCC scenarios) and observed changes in energy intensity the economy carbon intensity of energy. Observations (2000–2005) imply both an increase in energy intensity of the economy and carbon intensity of energy by approximately 0.25 and 0.3 per cent pa respectively.

#### Won’t be available till 2030

Favreau 10 (Didier, a senior analyst with IFP Energies nouvelles, France and graduated engineer from the Ecole Nationale Superieure des Mines de Saint-Etienne, France, “Economics act against CCS retrofits,” Oil and Gas Journal, October 4, 2010, <http://www.ogj.com/articles/print/volume-108/issue-37/transportations/economics-act-against-ccs-retrofits.html>, ADP)

Economics will likely prevent retrofitting carbon capture and sequestration technologies to existing power plants with a capture efficiency <40% and a residual life <15 years. Only capture of flue gases (postcombustion) is practical for existing units, although even this is often made difficult by space constraints. Other solutions use processes (oxycombustion or gasification), which cannot generally be adapted to existing installations except with major revamping. Current CO2 capture, transport, and storage costs are high because they apply to demonstration projects, requiring considerable research and development. These costs will drop by 2020-30 for new units, the various technologies being better demonstrated and commercial products benefiting from their larger scale. Some experts estimate potential cost reductions of about 40%. A high degree of uncertainty remains, however, regarding storage costs, which represent about 20% of the total CCS expenses.

#### Too slow

Rochon et al 08 Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne (Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

Carbon capture and storage (CCS) aims to reduce the climate impact of burning fossil fuels by capturing carbon dioxide (CO2) from power station smokestacks and disposing of it underground. Its future development has been widely promoted by the coal industry as a justification for the construction of new coal-fired power plants. However, the technology is largely unproven and will not be ready in time to save the climate.

### No Solvency – Leaks

#### Leaks prevent solvency

Johnson et al. 10 – PhD in Atmospheric Science

Andrew Simms, policy director of New Economics Foundation, UK think tank, and head of NEF's Climate Change Programme, Dr. Victoria Johnson, researcher for the climate change and energy programme at NEF, MSc with distinction in Climate Change from the University of East Anglia and PhD in Atmospheric Physics at Imperial College, London and Peter Chowla, Policy and Advocacy Officer at the Bretton Woods Project. “Growth isn’t possible”. New Economics Foundation, January 25,2010. http://www.neweconomics.org/sites/neweconomics.org/files/Growth\_Isnt\_Possible.pdf

As journalist Jeff Goodell writes in his book Big Coal, tens of thousands of people may be destined to live above a giant bubble of CO2 and since ‘CO2 is buoyant underground it can migrate through cracks and faults in the earth, pooling in unexpected places.’300 A sudden release of large amounts of CO2 due to, for example, an earthquake resulting in the fracturing or pipeline failure could result in the immediate death of both people and animals, since asphyxiation can result from inhalation of CO2 at just a 20 per cent concentration. Because CO2 is a colourless, odourless and tasteless gas; a large leak would be undetected. An example of just how catastrophic a leak could be is the natural limnic eruption of CO2 in 1986 from Lake Nyos in Cameroon. The sudden release of 1.6 Mt CO2 resulted in the asphyxiation of around 1,700 people and 3,500 livestock. If this rules out the storage of CO2 in land-based geological sites, let us consider sequestration in ocean saline aquifers, such as Sleipner in Norway. Slow, gradual leakage of CO2 could result in the dissolution of CO2 in shallow aquifers, causing the acidification of groundwater and undesirable change in geochemistry (i.e., mobilisation of toxic metals), water quality (leaching of nutrients) and ecosystem health (e.g., pH impacts on organisms).301 Transportation of captured carbon could also be problematic. CCS involves a process of converting CO2 to something else, or moving it somewhere else. Taking the transport of natural gas as an example, we can estimate how secure CO2 transportation might be. The world’s largest gas transport system, 2,400km long running through Russia (the Russian gas transport system), is estimated to lose around 1.4 per cent (a range of 1.0–2.5 per cent).302 This is comparable to the amount of methane lost from US pipelines (1.5 ± 0.5 per cent). Therefore, it is reasonable to assume that CO2 leakage from transport through pipelines could be in the order of 1.5 per cent. Furthermore, it is noteworthy that around 9 per cent of all natural gas extracted is lost in the process of extraction, distribution and storage.

#### No solvency—buildup of pressure in the pipelines fractures the rock, allowing CO2 to escape

Romm 10 – Senior Fellow at American Progress and Ph.D. in physics from MIT (Joe, “New study finds geologic sequestration ‘is not a practical means to provide any substantive reduction in CO2 emissions’” Center for American Progress April 27 2010 <http://thinkprogress.org/climate/2010/04/27/205870/ccs-stunner-new-study-finds-geologic-sequestration-is-not-a-practical-means-to-provide-any-substantive-reduction-in-co2-emissions/>) MLR

But any significant amount of leakage would render CCS pointless. The UK Guardian‘s article on the study quotes the coauthor: Previous modelling has hugely underestimated the space needed to store CO2 because it was based on the “totally erroneous” premise that the pressure feeding the carbon into the rock structures would be constant, argues Michael Economides, professor of chemical engineering at Houston, and his co-author Christene Ehlig-Economides, professor of energy engineering at Texas A&M University “**It is like putting a bicycle pump up against a wall. It would be hard to inject CO2 into a closed system without eventually producing so much pressure that it fractured the rock and allowed the carbon to migrate to other zones and possibly escape to the surface**,” Economides said. The paper concludes that **CCS “is not a practical means to provide any substantive reduction in CO2 emissions,** although it has been repeatedly presented as such by others.”

### No Solvency – No capture

#### Capture isn’t close to ready

EPA 10

“Report of the Interagency Task Force on Carbon Capture and Storage,” http://www.epa.gov/climatechange/downloads/CCS-Task-Force-Report-2010.pdf

As discussed above, CO2 removal technologies are not ready for widespread implementation on coal-based power plants, primarily because they have not been demonstrated at the scale necessary to establish confidence for power plant application (Kuuskraa, 2007). Since the CO2 capture capacities used in current industrial processes are generally much smaller than the capacity required for the purposes of GHG emissions mitigation at a typical power plant, there is considerable uncertainty associated with process scale-up. For example, maintaining adequate gas and/or liquid flow distribution in the larger absorption and regeneration reactors required for power plant applications could prove difficult. Other technical challenges associated with the application of these CO2 capture technologies to coal-based power plants include high capture and compression auxiliary power loads, capture process energy integration with existing power system, impacts of flue gas contaminants (NOx , SOx , PM) on CO2 capture system, increased water consumption and cost effective O2 supply for oxy-combustion systems (see Appendix A, Table A-3) (Kuuskraa, 2007). The following is a brief summary of two of the more significant technical challenges of applying these technologies.

#### Capturing technology is far from ready—massively increases costs and decreases coal plant efficiency —turns the case

Lackner and Sachs 5(Klaus S. Lackner, director of the Lenfest Center for Sustainable Energy at the Earth Institute, Department Chair of Earth and Environmental Engineering at Columbia University, Jeffrey D. Sachs, Director, Earth Institute, Columbia University, "A Robust Strategy for Sustainable Energy", Brookings Papers, 2005 pp. 215-284)

Before CO2 can be disposed of, it needs to be captured and transported to the disposal site. Transport does not pose any new challenges, but capture will require new technologies. The obvious place to capture CO2 is at those places where it is produced in large, concentrated amounts. The largest of these sources are power plants that operate on fossil fuels. Conceptually, the easiest way of capturing the CO2 produced by fossil fuel combustion is to scrub it from the flue (exhaust) gas. This option has been well explored and typically entails roughly a 30 percent energy penalty;68 that is, the scrubbing operation itself consumes roughly one third of the plant’s energy output. The addition to the price of electricity would be similar. The biggest downside of this technology is that, when installed as a retrofit, it leaves the plant running at far from optimal efficiency. Since the cost of CO2 scrubbing far exceeds the cost of the coal input, a power plant that collects its own CO2 would need to be substantially reoptimized for greatly improved efficiency. As a result, retrofitting capture technology is far more costly per unit of energy produced than installing such technology in a new plant.

#### Any stage of CCS is key to the others—that means if one fails the others do as well

Stigson et al., 11 (IVL Swedish Environmental Research Institute Ltd, former researcher at Mälardalen University (School of Sustainable Development of Society and Technology), Ph.D. in Energy and Environmental Engineering, Anders Hansson, Marten Lind, "Obstacles for CCS deployment: an analysisof discrepancies of perceptions", Mitig Adapt Strateg Glob Change, December 2011, Springer Science & Business)

As mentioned above, the different CCS stages within the full infrastructure are interdependent. This invokes a risk for the operators of each stage from two perspectives. Firstly, any stage within the CCS infrastructure will be unfeasible if the other stages are not available. A logic question for an industry looking to deploy one stage is if someone will supply the other stages. This boils down to the question of who moves first. This concern has also been highlighted by the UK Minister for Energy, Malcolm Wicks (2008), who identifies interdependency as one of the important aspects of deploying demonstration projects, i.e. proving the commercial, contractual, and financial feasibility of full CCS operations. Secondly, as a failure at one stage could bring operations at the other stages to a halt, there is also an operational risk. Both these risks are emphasized in the beginning of developing a robust infrastructure as the system flexibility can be expected to be low. While these risks are relatively easy to mitigate in demonstration project consortia including all systems, it may form an obstacle when it comes to first-movers who will pursue operations at one single stage. The issues should therefore be included on the CCS agenda as not to cause unnecessary uncertainties regarding operational feasibility and respondents views that governmental investments in supplying a transport infrastructure should be remembered.

### No Solvency – No Storage Capacity

#### CSS will fail – no capacity for storage and increases reliance on fossil fuels in the long term

Johnson et al. 10 – PhD in Atmospheric Science

Andrew Simms, policy director of New Economics Foundation, UK think tank, and head of NEF's Climate Change Programme, Dr. Victoria Johnson, researcher for the climate change and energy programme at NEF, MSc with distinction in Climate Change from the University of East Anglia and PhD in Atmospheric Physics at Imperial College, London and Peter Chowla, Policy and Advocacy Officer at the Bretton Woods Project. “Growth isn’t possible”. New Economics Foundation, January 25,2010. http://www.neweconomics.org/sites/neweconomics.org/files/Growth\_Isnt\_Possible.pdf

A detailed analysis (rather than an estimate) of known US geological sequestration sites undertaken by the US Department of Energy revealed that only 3GtC could be stored in abandoned oil and gas fields.303 This estimate, however, does exclude saline aquifers (very little is known about potential US saline aquifers). Assuming that the USA took responsibility for CO2 emissions that were directly proportional to its share of global emissions, the USA’s capacity to store its own carbon in known geological sequestration sites would be **exhausted in 12 years**. Similarly, a recent analysis explored the potential storage capacity in Europe. The study found that based on Europe’s current annual emission rate of 4.1 GtCO2 per year in the EU 25, the medium-range estimate of storage capacity is only 20 times this.304 In other words, CCS is clearly not a long-term solution, as ‘**peak storage’ could be reached relatively quickly**. Further sequestration would require expensive and potentially unsafe pipelines directing CO2 to sequestration sites further a field. This would be an energy-intensive process which is why CCS not only poses significant future risks in terms of leakage, but also reduces the net energy gained from a particular fuel – what has been called the ‘energy penalty’.305 Given these problems, to put such faith in schemes which are operationally immature, instead of decreasing our carbon emissions, seems outrageously risky. Surely it would be better **not to produce** the emissions in the first place? One further limitation of CCS is that, only one-third of emissions in industrialised countries are actually produced in fossil-fuelled power stations. A significant proportion comes from the transport sector (around 30 per cent), and as yet CCS has only been developed for static CO2 sources. By pursuing a CCS pathway, we are encouraging our continued reliance on fossil fuels delivering energy through a centralised system. Should CCS become economically viable, it could act to undermine initiatives to move towards a more efficient distributed energy system with diverse arrays of low carbon energy sources.

#### Carbon sequestration is unfeasible—one power plant would produce emissions requiring a storage area of a small U.S. state

Ehlig-Economides and Economides 10– Professor, Department of Petroleum Engineering, Texas A&M University; Professor, Department of Chemical Engineering, University of Houston (Christine and Michael J., “Sequestering carbon dioxide in a closed underground volume” Journal of Petroleum Engineering and Science 2010 <http://twodoctors.org/manual/economides.pdf>) MLR

The implications of this work are profound. A simple analytical model shows immediate results very similar to those that take hours to produce with numerical simulation. Much more important, the work shows that models that assume a constant pressure outer boundary for reservoirs intended for CO2 sequestration are missing the critical point that the reservoir pressure will build up under injection at constant rate. Instead of the 1–4% of bulk volume storability factor indicated prominently in the literature, which is based on erroneous steady state modeling, our finding is that **CO2 can occupy no more than 1% of the pore volume and likely as much as 100 times less.** This work has related the volume of the reservoir that would be adequate to store CO2 with the need to sustain injectivity. The two are intimately connected. In applying this to a commercial power plant the findings suggest that for a small number of wells the areal extent of the reservoir would be enormous, the size of a small US state. Conversely, for more moderate size reservoirs, still the size of Alaska's Prudhoe Bay reservoir, and with moderate permeability there would be a need for hundreds of wells. Neither of these bodes well for geological CO2 sequestration and the findings of this work clearly suggest that **it is not a practical means to provide any substantive reduction in CO2 emissions,** although it has been repeatedly presented as such by others.

#### It’s unfeasible at any cost—sequestered CO2 occupies 500 times its original volume

Ehlig-Economides and Economides 10– Professor, Department of Petroleum Engineering, Texas A&M University; Professor, Department of Chemical Engineering, University of Houston (Christine and Michael J., “Sequestering carbon dioxide in a closed underground volume” Journal of Petroleum Engineering and Science 2010 <http://twodoctors.org/manual/economides.pdf>) MLR

If all of the 1.75 billion tonnes annual reduction forecast for 2030 were to be achieved by sequestering carbon dioxide underground, this would amount to injection of 39 million bpd of supercritical carbon dioxide, assuming a density of 47.6 lbm/ft3. The US currently produces crude oil and lease condensate at a rate of about 5.4 million STB/d with actual reservoir volume perhaps slightly greater depending on the average formation volume factor. By comparison, adding current natural gas and natural gas liquid production at 11.8 million barrels of oil equivalent (BOE) per day gives a total US liquid and gaseous hydrocarbon voidage rate of about 16.2 million BOE/d with much of the crude oil production supported by pressure maintenance via water"ooding or an active water drive (www.eia.doe.gov). As another comparison, the US currently injects about 38 million bpd of oilfield water. Although this may appear to offer a reassuring analogy to the CO2 volume, in reality it is not, because oilfield water is typically injected in hydraulic communication with the oil or gas production to achieve pressure maintenance and thereby avoid surface subsidence that can occur from underground pore pressure depletion. Injected water usually replaces fluids that are produced and, still, water breakthrough is a common occurrence. Likewise, industrial, municipal, and agricultural groundwater use is strictly monitored, and optimal water management restricts groundwater use to what is recharged via annual precipitation. Both oilfield water injection and groundwater production are, thus, largely steady state processes. In contrast, carbon dioxide sequestration is not generally envisioned to be associated with any production of underground fluids, and analogies between carbon dioxide sequestration in deep saline aquifers or in depleted hydrocarbon reservoirs and EOR displacement processes are highly inappropriate. In volumetric terms, for coal density of 94 lbm/ft3 (depends on the type of coal) and supercritical carbon dioxide density of 48 lbm/ft3 (depends on pressure and temperature), more than twice the volume is required to sequester carbon dioxide underground than to remove carbon as coal. However, while a coal seam is approximately 100% coal, the carbon dioxide must be injected into rock with porosity on the order of 20%, representing 10 times more volume than originally occupied underground by the coal. Further, this paper will show that the volume multiplier is another 50 times more when compressibility and solubility are taken into account. The net result is that **it takes more than 500 times more volume to sequester carbon dioxide than was originally occupied as coal**. The pore volume required to sequester 1.75 billion tonnes is 182 billion barrels annually, and this represents about 8.5 times the total US crude oil reserves of about 21.5 billion barrels. To demonstrate these claims, this paper will consider carbon dioxide sequestration via EOR, in deep saline aquifers, and in depleted hydrocarbon reservoirs, using as a basis the emissions from an average coal power plant with generating capacity of 500 MW. Our very sobering conclusion is that **underground carbon dioxide sequestration via bulk CO2 injection is not feasible at any cost.**

#### Carbon storage is not viable—large volumes of CO2 require huge reservoirs and many more injection wells

Ehlig-Economides and Economides 10– Professor, Department of Petroleum Engineering, Texas A&M University; Professor, Department of Chemical Engineering, University of Houston (Christine and Michael J., “Sequestering carbon dioxide in a closed underground volume” Journal of Petroleum Engineering and Science 2010 <http://twodoctors.org/manual/economides.pdf>) MLR

Published reports on the potential for sequestration fail to address the necessity of storing CO2 in a closed system. Our calculations suggest that the volume of liquid or supercritical CO2 to be disposed cannot exceed more than about 1% of pore space. This will require from 5 to 20 times more underground reservoir volume than has been envisioned by many, and **it renders geologic sequestration of CO2 a profoundly non-feasible option for the management of CO2 emissions.** Material balance modeling shows that CO2 injection in the liquid stage (larger mass) obeys an analog of the single phase, liquid material balance, long-established in the petroleum industry for forecasting undersaturated oil recovery. The total volume that can be stored is a function of the initial reservoir pressure, the fracturing pressure of the formation or an adjoining layer, and CO2 and water compressibility and mobility values. Further, published injection rates, based on displacement mechanisms assuming open aquifer conditions are totally erroneous because they fail to reconcile the fundamental difference between steady state, where the injection rate is constant, and pseudo-steady state where the injection rate will undergo exponential decline if the injection pressure exceeds an allowable value. A limited aquifer indicates a far larger number of required injection wells for a given mass of CO2 to be sequestered and/or a far larger reservoir volume than the former.

#### CCS is unfeasible and doesn’t solve emissions

Romm 10 – Senior Fellow at American Progress and Ph.D. in physics from MIT (Joe, “New study finds geologic sequestration ‘is not a practical means to provide any substantive reduction in CO2 emissions’” Center for American Progress April 27 2010 <http://thinkprogress.org/climate/2010/04/27/205870/ccs-stunner-new-study-finds-geologic-sequestration-is-not-a-practical-means-to-provide-any-substantive-reduction-in-co2-emissions/>) MLR

Carbon capture and storage (CCS) has dug itself into quite a deep hole. Costs remain very, very high (see Harvard study: “Realistic” first-generation CCS costs a whopping $150 per ton of CO2 “” 20 cents per kWh!). And nobody wants the CO2 stored underground anywhere near them (see CCS shocker: “German carbon capture plan has ended with CO2 being pumped directly into the atmosphere”). Now comes a new study in the Journal of Petroleum Science and Engineering, “Sequestering carbon dioxide in a closed underground volume,” by Christene Ehlig-Economides, professor of energy engineering at Texas A&M, and Michael Economides, professor of chemical engineering at University of Houston. Here are its blunt findings: Published reports on the potential for sequestration fail to address the necessity of storing CO2 in a closed system. Our calculations suggest that the volume of liquid or supercritical CO2 to be disposed cannot exceed more than about 1% of pore space. This will require from 5 to 20 times more underground reservoir volume than has been envisioned by many, and it renders geologic sequestration of CO2 a profoundly non-feasible option for the management of CO2 emissions. The study concludes: In applying this to a commercial power plant the findings suggest that **for a small number of wells the areal extent of the reservoir would be enormous, the size of a small US state.** Conversely, for more moderate size reservoirs, still the size of Alaska’s Prudhoe Bay reservoir, and with moderate permeability there would be a need for hundreds of wells. Neither of these bodes well for geological CO2 sequestration and **the findings** of this work **clearly suggest that it is not a practical means to provide any substantive reduction in CO2 emissions,** although it has been repeatedly presented as such by others. Realistically, it has always been hard to see how CCS could be more than a small part of the solution to averting catastrophic climate change, as I discussed at length in my September 2008 post, Is coal with carbon capture and storage a core climate solution? We need to put in place 12 to 14 “stabilization wedges” by mid-century to avoid a multitude of catastrophic climate impact “” see “How the world can (and will) stabilize at 350 to 450 ppm: The full global warming solution (updated)” For CCS to be even one of those would require a flow of CO2 into the ground equal to the current flow of oil out of the ground. That would require, by itself, re-creating the equivalent of the planet’s entire oil delivery infrastructure, no mean feat.

### No Solvency – Storage Liability

#### Storage liability undermines all of CCS

Tady 7 - national political reporter

Megan, “Carbon Capture: Miracle Cure for Global Warming, or Deadly Liability?,” Alternet, http://www.alternet.org/environment/68490/?page=4

Benefits aside, the stored carbon dioxide is like a hot potato -- nobody wants to have the liability of ensuring hundreds of billions of tons of carbon dioxide that stays buried for hundreds of years. "Who pays for it if there's a leak?" asked Jackson of Duke University. Leonard thinks he knows. "[Industry has] been very upfront to Congress that there's no way that carbon sequestration will move forward unless the federal government assumes all liability for that project. It's very similar to what's happening to nuclear waste; industry is very happy to create it, but they themselves don't want to be stuck with the liability of what to do with that waste because they know it's dangerous."

#### Prevents federal government investment

Cash and Maloney 12 (Cathy Cash, associate editor for electric utility week, Peter Maloney, professor of physiology at John Hopkins medical school in the biochemistry, cellular and molecular biology graduate program , “CCS hurdles remain too high to make coal practical, but DOE sees big change by 2030,” Electric Utility Week, April 12, 2012, Lexisnexis, ADP)

Industry sees high costs and unresolved liability risk from carbon dioxide storage as a major hurdle for anyone who would want to build a coal-fired plant under the CO2 emission standard proposed last week, which would require carbon capture and storage. But federal energy officials believe a technological solution to the CCS hurdles, at reasonable cost, is on the 20-year horizon. "We have enough storage and operating experience to say we can do this," said John Litynski, carbon storage technology manager at the Department of Energy's National Energy Technology Laboratory. Still, commercial-scale demonstration at a power plant appears years away, even though several small-scale CCS pilot projects have taken place, and carbon capture at a plant is seen as more financially doable when combined with sale of the CO2 for enhanced oil recovery instead of storage in a repository. Currently, a 25-MW pilot CCS project at the Barry coal plant owned by Alabama Power is expected to begin injecting carbon into a saline geologic formation at the end of April or early May. Carbon is now filling the 13-mile pipeline from the plant near Mobile. The project by the Southeast Regional Carbon Sequestration Partnership is believed to be the only such pilot ongoing in the world. The cost of the storage project is $31 million, the Electric Power Research Institute said. A large-scale project would be more expensive and raise questions of liability, according to the industry research arm. "Storage is the key challenge right now," said Jeff Phillips, EPRI senior program manager for advanced generation. "I don't know of any company out there that says it can guarantee storage of CO2 forever. I don't see a company taking on that kind of liability unless there is a [federal] mandate." Storage of carbon in deep geologic formations would require extensive monitoring and long-term liability provisions. Site characterization would also prove to be a lengthy process in order for a company to say with confidence that it could provide 30 years of storage capacity, Phillips said. Thus, power plant developers planning new coal units with CCS would have to "start looking for storage long before you plan a power plant," he said. "It's a real roadblock." At NETL, Litynski noted that while issues of monitoring and operating deep geologic storage of carbon must be addressed, storage space is available for the future generations of coal-fired plants. "I don't see any significant hurdles between now and 2020 to say we couldn't have all the issues worked out," Litynski said, noting that EPA last July provided guidance for geologic sequestration of carbon and financial responsibility for underground injection control. Costs would still be high at that point, but would come down by 2030. Storage and long-term liability costs are not expected to be prohibitive, he said. Storage could cost $5 to $10 per ton, depending on the distance the carbon travels from the plant to its geologic storage site. Long-term liability could run 5 cents a ton, he said. Jared Ciferno, director of NETL's Office of Coal & Power R&D, said by 2020 the first generation of CCS technology — such as oxy-combustion or membrane separation — could be re-engineered from small-scale projects and deployed for new fossil generation facing the carbon standard. These pollution controls could boost electricity costs for consumers as much as 60% and carry an energy penalty of about 25% on the power plant, Ciferno said. But by 2030, advanced systems to capture carbon would cut these added costs in half, he said. Cost recovery an issue The power industry still sees the costs as prohibitive and EPA's standard for future coal plants as a death knell for coal, beyond the plants that already exist. "The economics of carbon capture and sequestration are the real challenge at this point. This rule doesn't change that," said American Electric Power spokeswoman Melissa McHenry. "It would be very difficult to build new coal plants with CCS when the technology is not proven on a commercial scale." AEP, the largest US coal-burning utility, ended its two-year collaboration with DOE last July to scale up CCS technology to a commercial level because the utility could not gain utility regulators' approval to recover its costs. AEP had received up to $334 million to pilot CCS for 235 MW of its Mountaineer plant. Commercial operation was slated for 2015. "It would be huge challenge to get a utility commission to approve a new coal plant with new CCS technology," McHenry said. "You couldn't give them a price or guarantee for performance at this point." EPA's proposed emission standard of 1,000 pounds of CO2 per MWh would apply to all future fossil fuel-fired boilers, integrated gasification combined-cycle units and stationary combined-cycle turbine units that generate electricity for sale and are larger than 25 MW. The most efficient coal-fired unit emits about 1,800 pounds/MWh, thus the proposal would require CO2 controls. Existing units, which includes plants under construction, operating units that undergo modifications, simple-cycle gas-fired turbines used to meet peak demand, and units that have air permits and start construction within the next 12 months are exempted from the standard. For most power companies the proposed carbon standard does not make a significant difference in their planning. New coal plants are already very difficult to bring to market. "It is more statement than substance," Pace Global Vice President Art Holland said of the rule. The standard will limit new coal plants to those with CCS, but "more regulatory support for these CCS technologies is needed to make them economically viable," Holland said. Last week, the Edison Electric Institute immediately called for Washington to accelerate development and deployment of CCS. Federal funding has been available for some time, but projects have been sidelined for reasons of regulatory reluctance to make ratepayers shoulder the cost, which remains high even with government help. And the government-aided FutureGen project in Illinois is still unrealized after years of trouble getting enough private-sector companies to invest. Tenaska, however, continues to plan two CCS projects, Taylorville in Illinois and Trailblazer in Texas. "The main hurdle is making the projects commercial," said Greg Kunkel, Tenaska's president of environmental affairs. Taylorville is pursuing a couple of paths toward that end, and with Trailblazer, the company is working with oil companies to use the captured CO2 for enhanced oil recovery, he said. Using CO2 for EOR has been seen so far as the more viable way to make carbon-capture projects practical. Kunkel echoed other companies' concerns about the costs and the need for more incentives for CCS. The commercial viability of CCS is also the highest hurdle for NRG Energy, which is considering a 200-MW CCS demonstration project at its W.A. Parish plant in Texas. The project is using $167 million from DOE's Clean Coal Power Initiative. The company needs to expand the project and have enough CO2 to make the economics work for enhanced oil recovery. To fund a project of that size, NRG is looking for private equity funding.

### No Solvency – Prefer Our Evidence

**CCS fails—8 reasons**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**This report, based on peer-reviewed independent scientific research shows** that:

**CCS cannot deliver in time to avoid dangerous climate change. The earliest possibility for deployment of CCS at utility scale is not expected before 2030**.1 **To avoid the worst impacts of climate change, global greenhouse gas emissions have to start falling after 2015**, just seven years away.

**CCS wastes energy. The technology uses between 10 and 40% of the energy produced by a power station.2**

**Wide scale adoption of CCS is expected to erase the efficiency gains of the last 50 years, and increase resource consumption by one third.**3

**Storing carbon underground is risky. Safe and permanent storage of CO2 cannot be guaranteed. Even very low leakage rates could undermine any climate mitigation efforts.**

**CCS is expensive. It could lead to a doubling of plant costs, and an electricity price increase of 21-91%.**4

**Money spent on CCS will divert investments away from sustainable solutions to climate change.**

**CCS carries significant liability risks. It poses a threat to health, ecosystems and the climate. It is unclear how severe these risks will be.**

### No Regulations Now

#### No regulations

Froomkin 12

Dan, Senior Washington Correspondent for the Huffington Post, “Auction 2012: Energy Lobby Finds Power In Money And Fear,” 1/31/12, http://www.huffingtonpost.com/2012/01/31/auction-2012-energy-lobby\_n\_1242134.html]//SH

Perhaps most important of all, the energy industry's political power has allowed it to crush -- and now make politically unthinkable -- any effort to assess the external costs of greenhouse gases created in the production and consumption of fossil fuels. Just as one point of reference, a 2009 report from the National Research Council tried to estimate the costs of air pollution and other harms that are not reflected in the market price of fossil fuels. The report pegged the price of the damage from fossil fuel production and consumption at $120 billion in the U.S. in 2005 alone -- and that notably did not include the cost of climate change, harm to ecosystems, effects of some toxic air pollutants and risks to national security, all of which the report was unable to quantify. Looking at power plants' burning of coal, the report found that damages from sulfur dioxide, nitrogen oxides and particulate matter averaged about 3.2 cents for every kilowatt-hour of energy produced. It estimated climate-related monetary damages at 0.1 cents to 10 cents per kwh, depending on assumptions. By contrast, coal costs 7 to 14 cents per kwh. Yet any kind of carbon tax or fee is politically impossible right now, said Kyle Ash, senior legislative representative for Greenpeace. It's not so much an issue of dogma. "There are a lot fewer climate deniers than people think," he said. It's a matter of money. "There's a lot of good data on which politicians are taking how much money from fossil fuel industries, and you can see clear connections," Ash said, pointing to a recent Greenpeace report titled "Polluting Democracy." "I think it's about who's paying for their campaigns," he said. The clearest evidence, he said, comes in the otherwise unresolvable contradiction between what politicians say and what they do. "The contradiction is that they're also really opposed to federal outlays, and they want to cut taxes," Ash said. "But they're fighting against the removal of fossil fuel subsidies."

#### If they happen, they will be watered down

Barringer and Gillis 12 (Felicity and Justin, March 27, “New Limit Pending on Emissions”, <http://www.nytimes.com/2012/03/27/us/new-rules-will-limit-greenhouse-gas-emissions.html>)

After months of delay, the Obama administration is about to unveil the first federal standards to explicitly limit greenhouse-gas emissions from new electric power plants — one of the chief sources of carbon dioxide emissions linked to [climate change](http://topics.nytimes.com/top/news/science/topics/globalwarming/index.html?inline=nyt-classifier). According to people briefed by the [Environmental Protection Agency](http://topics.nytimes.com/top/reference/timestopics/organizations/e/environmental_protection_agency/index.html?inline=nyt-org), all existing plants — including the 300 or so [coal](http://topics.nytimes.com/top/reference/timestopics/subjects/c/coal/index.html?inline=nyt-classifier)-fired power plants that now release the highest level of these emissions and yet-to-be-built plants that have already received E.P.A. permits — will be grandfathered in at current levels, meaning they are exempt from the new proposed rule. Under the new rule, expected to be announced this week, new power plants will have to emit no more than 1,000 pounds of carbon dioxide per megawatt-hour of energy produced. That standard permits the level of emissions achieved by natural gas-fired plants of the type generally built in the last few years, but would be too strict for almost all coal-fired power plants if they were not exempted. A new natural gas plant produces a little less than 1,000 pounds of carbon dioxide per megawatt-hour of electricity generated. A coal plant produces about 1,800 pounds.

### Environment Turn – Leaks

#### Co2 pipelines lead to dead zones

Winter 7 Human Resources Manager at Astral Media, Canada's largest radio broadcasting station, EcoGeek (Jozef Winter, November 27, 2007, “Carbon Sequestration Just a Pipe Dream?” [http://www.ecogeek.org/preventing-pollution/1100)//DR](http://www.ecogeek.org/preventing-pollution/1100%29//DR). H

Not only that, these pipes have to be under high pressures to keep the CO2 at a supercritical fluid state, requiring a lot of energy and equipment, not to mention pumping stations along the way. To add insult to injury, the pipes will, like those in the arctic, disrupt animals' ranges and migration routes. At least if the pipes leak, we're not contaminating the environs with oil or flammable gases. There will just be a small dead zone will where everything dies from lack of oxygen. It's all very exciting stuff.

### Environment Turn – Energy Consumption

#### CCS wastes energy and increases resource consumption

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**Capturing and storing carbon uses lots of energy, anywhere from 10-40% of a power station’s capacity.**16 **An energy penalty of just 20% would require the construction of an extra power station for every four built.**17 **These reductions in efficiency will require more coal to be mined, transported, and burned, for a power station to produce the same amount of energy as it did without CCS.**

**CCS will also use more precious resources. Power stations with capture technology will need 90% more freshwater** than those without**. This will worsen water shortages**, already aggravated by climate change.18 Overall, **wide-scale adoption of CCS is expected to erase the efficiency gains of the last 50 years, and increase resource consumption by one third.19**

#### Plan is worse for the environment and resource consumption

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**Relying on CCS to mitigate CO2 emissions means accepting a 10-40% energy penalty** at the power station, depending on the type of technology used.91 **An energy penalty of just 20% would require the construction of an additional power station for every four** of the same size built with CCS, **to maintain the same net output before the CCS was fitted.**92

**These reductions in efficiency will require more coal** to be mined, transported and burned **to produce the same amount of energy as power stations without CCS.** A new 500 MWe sub-critical pulverised coal (PC) unit with carbon capture will have to burn an additional 76,000 kg of coal per hour to maintain the same net output as a similar sized plant without capture. An ultra-critical PC unit would require a boost in its coal feed rate of 44,000 kg/h (see Table 2).93 **CCS would not only worsen fuel security issues but intensify the major localised environmental problems associated with extraction and transport of coal, including habitat destruction, damage to rivers and waterways and air pollution.**

**Power station efficiency losses would be most pronounced** when capture systems are retrofitted to existing infrastructure. **This is because technical mismatches** between power stations and capture systems means components function below their design capacity levels. These mismatches are most pronounced with pulverised sub-critical coal units. A study by Alstom Power, Inc estimates that **the addition of MEA flue gas scrubbing to a 500 MWe pulverised coal unit would reduce efficiency by 14.5%** points (from 35% efficiency to 20.5%) and cost as much as US$1600/kWe.94 **The substantial loss in efficiency**, coupled with the high cost of retrofitting these types of plants, **means a large proportion of existing coal power stations are unlikely** ever **to be retrofitted** for capture.

**The decision on whether or not to retrofit** also **hinges on** a power station’s proximity to a storage site; **the necessary infrastructure to deliver** the **CO2** to it; **and the availability of additional resources**, such as water. **The numerous coalfired power stations scheduled to be built between now and whenever CCS may be ready for commercial deployment will most likely never have their carbon captured** and will continue to pollute unabated until they are closed down.

**CCS not only cuts energy efficiency but also increases resource consumption.** A study by Rubin et al. (2005), quantified the impacts of capture systems on plant resource consumption and emission rates. For a 500MWe PC unit fitted with carbon capture, a **24% energy penalty was estimated to have resulted in an increase of approximately 25% for fuel**, limestone (for the flue gas desulphurisation system) and ammonia (for nitrogen oxide control) inputs (see Table 3).95 A US DOE analysis on the freshwater requirements for carbon capture found that **in 2030, deploying CCS in PC plants with scrubbers and IGCC plants would increase water consumption in all scenarios examined by 90%** (anywhere from 2.2 to 4.3 billion gallons of water per day).96 In a report for the German Department for the Environment, the Fraunhofer Institute estimates that **wide-scale adoption of CCS could erase the efficiency gains of the last 50 years and increase resource consumption by one third.**97

Greater energy efficiency is half of the solution to tackling the climate crisis. **Employing a technology that reduces the energy efficiency of coal-fired power plants will not bring about the sustainable energy future needed to protect the climate.**

### Environment Turn – Mining

#### CCS leads to new mining – tanks the environment

Tady 7 - national political reporter

Megan, “Carbon Capture: Miracle Cure for Global Warming, or Deadly Liability?,” Alternet, http://www.alternet.org/environment/68490/?page=4

Even if CCS becomes cheap, and scientists guarantee carbon dioxide will stay buried, some critics still won't be swayed. They say that although CCS addresses greenhouse gas emissions, it doesn't look at the ramifications of mining and shipping coal, and of the pollutants that are still released in the air during burning. Although industry is marketing CCS as a "clean coal" technology, Leonard says the term is a misnomer, and that nothing about coal is clean. "The idea of clean coal never addresses the impact of coal's entire lifecycle," Leonard said. "Coal mining is one of the most destructive environmental atrocities in this country or globally. They only address clean coal at its final stage of combustion at the power plant." One destructive coal mining technique is mountaintop removal, a process where forests are clear-cut and the tops of mountains are blasted away with explosives to expose underlying layers of coal. The method has decimated the mountains and environment of Appalachia and produced devastating impacts on the health of communities. Both Leonard and Kill fear that CCS will only spur more coal mining, not curb it.

#### Mountaintop mining kills biodiversity—flooding and pollution

**Palmer et al. 10** – Director National Socio-Environmental Synthesis Center Professor Department of Entomology University of Maryland Professor Chesapeake Biological Laboratory University of Maryland Center for Environmental Science (Margaret, “Mountaintop Mining Consequences” Science Journal, January 8 2010, <http://www.filonverde.org/images/Mountaintop_Mining_Consequences_Science1%5B1%5D.pdf>) MLR

Ecological Losses, Downstream Impacts The **extensive tracts of deciduous forests destroyed by MTM**/VF **support some of the highest biodiversity in North America, including several endangered species. Burial of headwater streams by valley fills causes permanent loss of ecosystems that play critical roles in ecological processes such as nutrient cycling and production of organic matter for downstream food webs; these** small Appalachian **streams also support abundant aquatic organisms, including many endemic species** (5). Many studies show that **when more than 5 to 10% of a watershed’s area is affected by anthropogenic activities, stream biodiversity and water quality suffer** ( 6, 7). Multiple watersheds in WV already have more than 10% of their total area disturbed by surface mining (table S1). Hydrologic flow paths in Appalachian forests are predominantly through permeable soil layers. However, **in mined sites, removal of vegetation, alterations in topography, loss of topsoil, and soil compaction from use of heavy machinery reduce infiltration capacity and promote runoff** by overland flow ( 8). **This leads to** greater storm runoff and **increased frequency and magnitude of downstream flooding** ( 9, 10). Water emerges from the base of valley fills containing a variety of solutes toxic or damaging to biota ( 11). Declines in stream biodiversity have been linked to the level of mining disturbance in WV watersheds ( 12). Below valley fills in the central Appalachians, streams are characterized by increases in pH, electrical conductivity, and total dissolved solids due to elevated concentrations of sulfate (SO4), calcium, magnesium, and bicarbonate ions ( 13). The ions are released as coal-generated sulfuric acid weathers carbonate rocks. Stream water SO4 concentrations are closely linked to the extent of mining in these watersheds ( 11, 14). We found that significant linear increases in the concentrations of metals, as well as decreases in multiple measures of biological health, were associated with increases in stream water SO4 in streams below mined sites (see the chart on page 149). **Recovery of biodiversity in mining waste-impacted streams has not been documented**, and **SO4 pollution is known to persist long after mining ceases** ( 14).

#### Peer reviewed studies prove the laundry list of mining impacts

**KTFC.org 11** (“Health Impacts of Mountaintop Removal Coal Mining” KTFC.org, 2011 <http://www.kftc.org/our-work/canary-project/campaigns/mtr/health/MTRHealthImpacts.pdf>) MLR

**Volumes of scientific evidence and data illustrate the harm to human health from exposure to dust and** numerous **toxins released into the air and water by surface mining**. In the last two years alone, **peer-reviewed studies** by Dr. Michael Hendryx and others **have demonstrated that: • people living near mountaintop mining have cancer rates of 14.4% compared to 9.4% for people elsewhere** in Appalachia; • **the rate of children born with birth defects is 42% higher in mountaintop removal mining areas; • the public health costs of pollution from coal operations in Appalachia amount to a staggering $75 billion a year.** These findings are consistent with an earlier account of health impacts related to mountaintop mining, “Mountaintop Mining Consequences,” published in the journal Science in January 2010. According to that study: **[G]roundwater samples from domestic supply wells have higher levels of mine-derived chemical constituents than well water from unmined areas. Human health impacts** may **come from contact with streams or exposure to airborne toxins and dust**. State advisories are in effect for excessive human consumption of [Selenium] in fish from MTM/VF affected waters. **Elevated levels of airborne, hazardous dust have been documented around surface mining operations. Adult hospitalizations for chronic pulmonary disorders and hypertension are elevated as a function of county-level coal production, as are rates of mortality; lung cancer; and chronic heart, lung, and kidney disease.** Health problems are for women and men, so effects are not simply a result of direct occupational exposure of predominantly male coal miners.

#### Exacerbates environmental and economic damage

**KTFC.org 11 – cites Dr. Paul Epstein, physician and associate director of the Center for Health and the Global Environment at Harvard Medical School** (“Health Impacts of Mountaintop Removal Coal Mining” KTFC.org, 2011 <http://www.kftc.org/our-work/canary-project/campaigns/mtr/health/MTRHealthImpacts.pdf>) MLR

**A February 2011** study by Dr. Paul Epstein **details the economic, health and environmental costs associated with each stage in the life cycle of coal.** In terms of human health, **the report estimates $74.6 billion a year in public health burdens in Appalachian communities**, with a majority of the impact **resulting from increased healthcare costs, injury and death**. The **yearly and cumulative costs from the mining, processing, transport, and combustion of coal affect individuals, families, communities, ecological integrity, and the global climate.** Dr. Epstein says: “**The public is unfairly paying for the impacts of coal use.** Accounting for these ‘hidden costs’ doubles to triples the price of electricity from coal per kWh, making wind, solar, and other renewable[s] very economically competitive. Policymakers need to evaluate current energy options with these types of impacts in mind.”

### Environment Turn – Mining – Birth Defects

#### Mountaintop mining increases the rate of birth defects

**KTFC.org 11 – cites studies from the journal Environmental Research** (“Health Impacts of Mountaintop Removal Coal Mining” KTFC.org, 2011 <http://www.kftc.org/our-work/canary-project/campaigns/mtr/health/MTRHealthImpacts.pdf>) MLR

**A May 2011 study in the journal Environmental Research found a significant elevation in** most types of **birth defects among babies born to mothers who lived in a county with mountaintop mining during pregnancy**, compared with other counties in Appalachia. The study looked at two periods of time, 1996-1999 and 2000-2003, and showed that the overall rate of birth defects was 13% higher in the earlier period, and increased to 42% higher in the later period. The report concludes that **disparities in birth defects have become more pronounced as mountaintop mining has expanded.** “This study shows that **places where the environment** – the earth, air and water – **has undergone the greatest disturbance from mining are also the places where birth defect rates are the highest**,” said Dr. Ahern. “This is evidence that **mountaintop mining practices** may **cause health impacts on people living in those areas, before they are even born**."

### Environment Turn – Mining – Cancer

#### Mountaintop mining exacerbates the number of cancer cases

**KTFC.org 11 – cites Dr. Michael Hendryx, Associate Professor in the Department of Community Medicine, West Virginia University** (“Health Impacts of Mountaintop Removal Coal Mining” KTFC.org, 2011 <http://www.kftc.org/our-work/canary-project/campaigns/mtr/health/MTRHealthImpacts.pdf>) MLR

**A July 2011** study went door to door in West Virginia and **found cancer rates significantly higher in a community exposed to mountaintop removal mining compared to a non-mining communit**y. The cancer rate in a central Appalachian county without mountaintop removal mining was 9.4%, compared to a rate of 14.4% in a county with mountaintop removal. **Among the 1.2 million American citizens living in mountaintop removal mining counties** in central Appalachia, **this 5% difference would translate to an additional 60,000 cases of cancer linked to strip-mining practice.** “This significantly higher risk was found after controlling for age, sex, smoking, occupational exposure and family cancer history. **The study adds to the growing evidence that mountaintop mining environments are harmful to human health**,” said the study’s author, Dr. Michael Hendryx.

### Environment Turn – Mining – Clearcut

#### Mountaintop removal mining clearcuts major forests

**Huey 9** (Miranda, “Mountaintop Removal Mining” Greeniacs.com, 8 July 2009, http://www.greeniacs.com/GreeniacsArticles/Energy/Mountaintop-Removal-Mining.html) MLR

**Due to the** technology, power, and **brute force of modern mountaintop removal mining, taking apart an entire mountain can happen as quickly as one year, yet leave lasting damage. First, any forests are clearcut, which eliminates the local wildlife and ecosystem.** For more on clearcutting, check out this article. Next, **explosives are used to blast up to 800 feet of mountaintop. Then, the remaining soil is shoveled and** either **trucked away** or pushed into the mountain's valleys. After this, **huge machines** called draglines, which weigh up to 8 million pounds and as tall as 20 stories, **dig deeply into the mountain for the coal**. Although coal companies are required by law to restore the land as best they can to its original shape, many companies in fact do not actually follow through. Even when they do, the reclamation sites end up nothing like the original, since the soil often becomes acidic and infertile.

#### Clearcutting collapses biodiversity and exacerbates global warming

**Huey 9** (Miranda, “Clearcutting” Greeniacs.com, 22 June 2009, <http://www.greeniacs.com/GreeniacsArticles/Land/Clearcutting.html>) MLR

**Clearcutting has a major environmental impact on the water cycle. Since trees trap water and topsoil, cutting them down increases the risk of flooding. When it rains, the water and topsoil run over land down to rivers, turning them brown, creating areas of excess nutrients in the sea**.1 One country that has been greatly affected by deforestation induced flooding is North Korea, where state policy for decades was to clearcut to convert forests into farmland. As major areas were cleared, rains destroyed roads, power lines, and agricultural fields. Even after they adopted a policy of reforestation in 1994, **the floods have continued to devastate neighboring farmland and led to massive famines in** the country.2 **Another unfortunate victim of clearcutting has been the** local **wildlife** living in the forest ecosystem.3 **Clearcutting** essentially **demolishes entire habitats, and makes the habitats more vulnerable in the future to damage by insects, diseases, acid rain, and wind.**4 In addition to wildlife victims, **clearcutting can contribute to problems for ecosystems that depend on forests, like the streams and rivers which run through them. Clearcutting prevents trees from shading riverbanks, which raises the temperature of riverbanks and rivers, contributing to the extinction of some fish and amphibian species.** Because the trees no longer hold down the soil, **river banks increasingly erode as sediment into the water, creating excess nutrients which exacerbate the changes in the river and create problems miles away, in the sea**.5 **Clearcutting is** also **a major contributor to global warming**.6 **When a tree trunk gets cut down, the crown, wood debris, and vines are left in the forest to decompose, which releases carbon dioxide**. To compound the problem, **sawmills can only make use of 30-40% of the wood** put into them, **and the other 60-70% of the wood becomes sawdust and scrap, which again decomposes into carbon dioxide**.7 **Clearcutting releases even more greenhouse gases into the atmosphere than forest fires**.8 **To make matters worse**, after clearing, **the remaining scrub and brush are sometimes burnt in large burn piles, directly polluting the atmosphere with particulate matter.**9

#### Turns warming—deforestation from MTM releases millions of tons of CO2

**Kiem 7** – Wired Science reporter and freelance journalist (Brandon, “Blowing the Top Off Mountaintop Mining” Wired, September 10 2007, <http://www.wired.com/science/planetearth/news/2007/09/mountaintop_mining?currentPage=all>) MLR

**To begin a mountaintop-removal operation, crews clear trees from the site. Then they dynamite to shake the peaks loose, and excavate the coal** with a 2,000-ton, 20-story-high machine called a dragline. **They bulldoze the debris, dumping it into nearby valleys.** The practice is relatively new, dating from the mid-1980s, and it's already responsible for about half of all Appalachian coal mining. It's cheaper than old-fashioned techniques, and safer in the short run because miners don't have to tunnel underground. It also lets mining companies reach more coal than they could by digging shafts. The environmental impacts, however, are far greater. **According to the E**nvironmental **P**rotection **A**gency, **MTR destroyed more than 1,200 miles of Appalachia's streams and 7 percent of its forests between 1985 and 2001.** Approximately **800 square miles of mountains were leveled.** According to the EPA, **waste from MTR will bury another 1,000 miles of streams in the next decade.** Mulhern says **the effects are also felt downstream. "Headwater streams are where life is born, creating the nutrients and energy that flow downstream**," she says. "**All that is lost when you fill the headwaters and replace them with storm drains**." The EPA estimates that **at least 2,300 square miles of forest --** an area the size of Delaware -- **will be lost by 2010.** In the past, cleared mountaintops have been vegetatively reclaimed by grass and shrubs rather than the region's characteristic hardwood forests. "**Appalachia is** America's own little miniature rain forest," says Bonds. "It's **the world's most diverse temperate hardwood forest. The Appalachian forests are the carbon sinks and lungs of the East Coast**." According to a rough estimate by West Virginia University bio-geochemist William Peterjohn, **the deforestation could add as much as 138 million tons of carbon dioxide into the atmosphere** -- and that's not even counting the even-larger CO2 emissions from burning the coal.

### Environment Turn – Mining – AT: Regs Solve

#### Existing regulations fail—not enforced and contamination persists

**Palmer et al. 10** – Director National Socio-Environmental Synthesis Center Professor Department of Entomology University of Maryland Professor Chesapeake Biological Laboratory University of Maryland Center for Environmental Science (Margaret, “Mountaintop Mining Consequences” Science Journal, January 8 2010, <http://www.filonverde.org/images/Mountaintop_Mining_Consequences_Science1%5B1%5D.pdf>) MLR

A Failure of Policy and Enforcement **The U.S. Clean Water Act and its implementing regulations state that burying streams with materials discharged from mining should be avoided.** Mitigation must render nonsignifi cant the impacts that mining activities have on the structure and function of aquatic ecosystems. **The Surface Mining Control and Reclamation Act imposes requirements to minimize impacts on the land and on natural channels**, such as requiring that water discharged from mines will not degrade stream water quality below established standards. **Yet mine-related contaminants persist in streams well below valley fills, forests are destroyed, headwater streams are lost, and biodiversity is reduced; all of these demonstrate that MTM/VF causes significant environmental damage despite regulatory requirements to minimize impacts.** Current mitigation strategies are meant to compensate for lost stream habitat and functions but do not; **water-quality degradation caused by mining activities is neither prevented nor corrected during reclamation or mitigation.** Clearly, **current attempts to regulate MTM/ VF practices are inadequate**. Mining permits are being issued despite the preponderance of scientific evidence that impacts are pervasive and irreversible and that mitigation cannot compensate for losses. Considering environmental impacts of MTM/VF, in combination with evidence that the health of people living in surface-mining regions of the central Appalachians is compromised by mining activities, we conclude that MTM/VF permits should not be granted unless new methods can be subjected to rigorous peer review and shown to remedy these problems. Regulators should no longer ignore rigorous science. The United States should take leadership on these issues, particularly since surface mining in many developing countries is expected to grow extensively ( 32).

### Environment Turn – Drinking Water

#### Contaminates drinking water

Neural Energy 12

“Carbon Transport & Sequestration,” http://www.neuralenergy.info/2011/09/carbon-sequestration.html

Drinking Water Contamination - If CO2 gets into shallow freshwater aquifers, small amounts of trace metals will be freed from the rock volume. In a laboratory experiment, researchers exposed the experimental water samples to a flow of CO2 designed to simulate a slow leak and observed chemical changes that occurred over the course of more than 300 days. The CO2 caused the pH of the water in all the samples to drop 1–2 units as the gas reacted with the water to form carbonic acid. The drop in pH caused the rock in the samples to weather, increasing the concentration in the water of elements that had been previously part of the rock. Although the specific chemical changes depended on the unique geochemistry of each sample’s respective site, the authors report that on the whole, CO2 caused concentrations of alkali and alkali earth elements, as well as manganese, cobalt, nickel and iron, to increase—in some cases by more than two orders of magnitude. Concentrations of aluminum, manganese, iron, zinc, cadmium, selenium, barium, thallium and uranium in some samples neared or exceeded maximum contaminant levels set by the EPA.

### AT: Coal Advantage – Transition Now

#### Utilities are transitioning to natural gas now – it’s because of low prices, not regulations

Bertrand 6-11

Pierre, “Blame Coal's Hardship On Economic Factors, Not Federal Regulations, Says EPA Administrator,” International Business Times, http://www.ibtimes.com/articles/350973/20120611/coal-natural-gas-epa-lisa-jackson.htm

U.S. Environmental Protection Agency Administrator Lisa Jackson said Monday her environmental policies are not to blame for the coal industry's current hardships, despite tougher emission standards the industry says increases their costs and dampens demand for coal. Speaking to the Guardian, Jackson said coal's share of electricity generation in the U.S. is diminishing for purely economic reasons, and the EPA's enforcement of carbon capture devices is not a major factor. The U.S. Energy Information Administration said coal's share of electric generation has fallen to 34 percent, its lowest point since 1973. It's being supplanted by natural gas, whose price is depressed thanks to advances in drilling techniques. Because it's cheaper to burn natural gas, utilities are making the switch. "So in my opinion the problem for coal right now is entirely economic," Jackson said. "The natural gas that this country has and is continuing to develop is cheaper right now on average. And so people who are making investment decisions are not unmindful of that. How could you expect them to be?"

#### Utilities are bailing on coal now

Everly 6-4

Steve, “Coal losing favor as energy source for electric plants Environmental concerns, lower prices are changing officials’ outlooks, Black & Veatch survey finds,” http://www.kansascity.com/2012/06/04/3642393/coal-losing-favor-as-energy-source.html#storylink=cpy

King coal is rapidly losing support among many who were once its most fervent supporters, electric utility executives, according to a new report by a subsidiary of Black & Veatch. Low natural gas prices and environmental regulations have had coal on the defensive for some time. But utility executives, despite using more natural gas to generate power, have been reluctant to abandon the idea of coal as the best economical option. But that relationship is changing. Black & Veatch, an Overland Park engineering and consulting firm that regularly surveys the industry, a year ago found that 82 percent of utility executives responding said that coal had a future when “fiscal realities were fully considered.” But in this year’s report, that number fell to 58 percent. “The percentage of respondents who believe there is a future for coal in the United States has dropped significantly,” the report concluded.

#### The aff can’t reverse this trend – it’s because of low natural gas prices

Wald 12

Matthew, “With Natural Gas Plentiful and Cheap, Carbon Capture Projects Stumble,” NYT, Proquest

But even as the Environmental Protection Agency prepares to open hearings on the proposed rule, unveiled in March, industry experts say the persistently low price of natural gas is threatening the viability of the nation’s carbon capture projects. Natural gas is so cheap and plentiful that utilities have little incentive to build coal-fired plants with the capture technology. And the proposed rule exempts existing coal- and gas-fired plants. In the tiny universe of American carbon capture projects, the first casualty may be the Taylorville Energy Center, a project in the coal fields of Illinois. The plan was to cook coal into methane, capture the carbon dioxide released in the process, then burn the methane in a conventional natural gas-style power plant. But Taylorville’s backers, unable to persuade the state legislature to approve the project because of its estimated $3.5 billion price, are considering deferring the coal element and simply building the gas-burning plant for one-third the cost. “It’s primarily due to the low natural gas prices, and how that affects the political environment,” said Bart Ford, a vice president of Tenaska, the developer. “We’re not changing the nature of the facility, just deferring the synthetic natural gas portion.”

### AT: Econ Advantage – Coal Not Key to Economy

#### Coal hurts the economy – studies prove

Apergis and Payne 10 (Nicolas and James E., March, “Coal consumption and economic growth: Evidence from a panel of OECD countries” pdf [Table 5 omitted])

The results of the short- and long-run Granger-causality tests are reported in Table 5. Eq. (2a) shows that real gross fixed capital formation and the labor force each have a positive and statistically significant impact on economic growth in the short-run whereas coal consumption has a negative and statistically significant impact. As alluded to in Section 2, the negative impact of coal consumption on economic growth may be attributed to an inefficient and excessive use of coal consumption as well as the possibility that the environmental costs of coal usage outweigh the immediate economic benefit of coal usage on real GDP. In terms of Eq. (2b), economic growth has a significant negative influence on coal consumption, real gross fixed capital formation has a significant positive impact, and the labor force has a statistically insignificant impact. As mentioned in Section 2, the negative impact of economic growth on coal consumption may suggest that an economy is becoming less coal intensive, for instance, electricity production from coal as a proportion of total electricity production may be in decline. In the case of Eq. (2c), both economic growth and the labor force each have a significant positive impact on real gross fixed capital formation while coal consumption has a statistically insignificant impact. With regard to Eq. (2d), both economic growth and real gross fixed capital formation have a significant influence on the labor force whereas coal consumption is statistically insignificant. Thus, from the short-run causality results, it appears there is bidirectional causality between coal consumption and economic growth in which an increase in coal consumption has a negative impact on economic growth and likewise an increase in economic growth has a negative impact on coal consumption. The long-run dynamics displayed by the error correction terms from Eqs. (2a) and (2d) reveal that economic growth, coal consumption, real gross fixed capital formation, and the labor force respond to deviations from long-run equilibrium given the statistically significance of their respective error correction terms. However, the speed of adjustment is rather slow given the magnitude of the coefficients on the error correction terms. Overall, the results suggest there is bidirectional causality between coal consumption and economic growth in both the short- and long-run. The presence of bidirectional causality lends support for the feedback hypothesis whereby coal consumption and economic growth are interdependent. The interdependence between coal consumption and economic growth indicates that energy policies designed to decrease coal intensity, improve energy efficiency, and the use of renewable energy sources would serve to promote the development of long-term energy and environmental strategies that help meet global energy demands. 4. Concluding remarks While coal has been a reliable energy source in many countries investigation of the relationship between coal consumption and economic growth is pertinent both in terms of the economic and environmental consequences of its continued usage. Specifically, this study tests the causal relationship between coal consumption and economic growth within the context of a multivariate panel error correction model for 25 OECD countries over period 1980–2005. First, the Larsson et al. (2001) panel cointegration test indicates there is a unique long-run equilibrium relationship between real GDP, coal consumption, real gross fixed capital formation, and the labor force. Though the long-run elasticity estimates are positive and statistically significant for real gross fixed capital formation and the labor force, the elasticity estimate for coal consumption is negative and statistically significant. This negative impact of coal consumption on real output in the long-run may be the result of inefficient and excessive use of coal as well as the possibility that the immediate economic benefit associated with the use of coal is outweighed by the economic costs imposed on the environment by carbon dioxide emissions. Second, the estimation of panel error correction model reveals there is both short- and long-run bidirectional causality between coal consumption and economic growth, which lends support for the feedback hypothesis. However, the short-run causality results indicate that an increase in coal consumption has a negative impact on economic growth. In this case, policymakers should explore the feasibility of either increasing the efficient use of coal or reducing coal consumption. For example, legislation that would restrict the growth of carbon dioxide emissions might provide an incentive to enhance efficiency or curb excessive coal consumption. Furthermore, greater use of sustainable coal technologies that permit carbon dioxide capture and storage may reduce the environmental costs upon on the economy of excessive coal consumption. Similarly, an increase in economic growth has a negative impact on coal consumption which might suggest that an economy may be less coal intensive, as alternative energy sources are employed such as renewable energy. The use of government tax credits and subsidies for the production and use of sustainable alternative energy sources may provide the needed incentive for both producers and consumers to substitute away from coal to more sustainable energy sources over time.

#### Prefer our evidence – theirs overestimates the coal industries’ potential and underestimates ours

Nisbet 10 (Matthew C., Professor of Communication at the American University, December 4, “Standing Up for Clean Energy: Comparing Green Jobs to Coal Industry Jobs”, <http://bigthink.com/age-of-engagement/standing-up-for-clean-energy-comparing-green-jobs-to-coal-industry-jobs?page=2>)

Based on the coal and oil industries' history and heavy investment in public relations, lobbying, and advertising, Americans and lawmakers have a faulty statistical sense of these industries' true contribution to the U.S. workforce. In addition, Americans and lawmakers tend to underestimate the current size and near term growth potential of the clean energy sector. This leads to false attributions and susceptibility to claims by conservatives and others that climate legislation is a massive "job killer" when in fact it is a likely net job creator. Correcting this faulty statistical sense, especially in comparison to the current and projected size of the clean energy sector, should be an important communication focus and goal. What's needed is the avoidance of hype about the clean energy sector and instead strong third-party studies, analyses, and endorsements from relevant economists and market research firms. Yet beyond these statistical presentations and expert endorsements, job potential and creation needs to be emphasized at a local level, with specific examples and companies featured in local news coverage and in public engagement campaigns. It's another example of how as we move into the next stage of the climate debate, many different factors reinforce the importance of local and regional engagement.

**Turn—shift away from fossil fuels key to jobs**

**Roberts 08** Staff Writer at Grist.org (David, December 2008, “The Truth About Green Jobs,” [http://www.motherjones.com/environment/2008/11/truth-about-green-jobs)//DR](http://www.motherjones.com/environment/2008/11/truth-about-green-jobs%29//DR). H

**Proponents of fossil fuels tout job creation, but the truth is there aren't many jobs in dirty energy, and that number is declining.** To wit: **Over the last two decades**, coaloutput in the US has grown by a third, while the number of **jobs in the coal industry has fallen by half.** According to economist John A. "Skip" Laitner of the American Council for an Energy-Efficient Economy, **for every $1 million of revenue in energy-related sectors, fewer than two jobs are created, compared to seven jobs per $1 million earned elsewhere.** Thus**, shifting investment away from conventional energy can't help but create more jobs, particularly during the transition to a green economy, when construction, efficiency, and other labor-intensive industries will be scaling up.**

**US not key to coal market**

**Carr 6/13** Bloomberg (Mathew, June 13, 2012, “Falling Coal Use In U.S. Fails To Stem Global Growth: BP,” [http://www.bloomberg.com/news/2012-06-13/falling-coal-use-in-u-s-fails-to-stem-global-growth-bp.html)//DR](http://www.bloomberg.com/news/2012-06-13/falling-coal-use-in-u-s-fails-to-stem-global-growth-bp.html%29//DR). H

**Falling coal consumption in the U.S. last year failed to stem the pace of growth in the fuel’s use globally**, which was driven by China, Australia, Ukraine and South Korea, according to BP Plc. (BP/)

**Coal represented 30 percent of global energy consumption**, the highest since 1969, the oil producer said today in its annual Statistical Review of World Energy.

**Global use rose 5.4 percent in 2011**, similar to the downgraded 5.5 percent pace in 2010, BP said. **U.S. consumption dropped more than any other nation, declining 24.2 million metric tons of oil equivalent, or 4.6 percent, to 501.9 million tons.** China’s use surged 9.7 percent to 1.84 billion tons.

The 2.5 percent growth in global primary energy consumption was caused by increases in emerging economies, BP said. China accounted for 71 percent of growth last year. Use in Organisation for Economic Co-operation and Development nations declined 2.5 percent, led by a 5 percent drop in Japan. **The data suggests that growth in global CO2 emissions from energy use continued in 2011, but at a slower pace than in 2010**, BP said.

### AT: Econ Advantage – Green Jobs Outweigh

#### Green jobs are key to the economy

DiPasquale and Gordon 11 (Christina C. and Kate, September 7, “Top 10 Reasons Why Green Jobs Are Vital to Our Economy”, http://www.americanprogress.org/issues/2011/09/top\_ten\_green\_jobs.html)

Green jobs are integral to any effort to jumpstart our economy and reduce as rapidly as possible our 9.1 percent unemployment rate. The rapid growth of green jobs will boost demand in our economy by reducing unemployment, make America more competitive in the global economy, and protect our public health—all of which will result in greater economic productivity and long-term economic prosperity. Here are the top 10 reasons why this is the case today and into the future: 1. There are already 2.7 million jobs across the clean economy. Clean energy is already proving to be larger job creation engine than the heavily subsidized fossil-fuels sector, putting Americans back to work in a lackluster economy. 2. Across a range of clean energy projects, including renewable energy, transit, and energy efficiency, for every million dollars spent, 16.7 green jobs are created. That is over three times the 5.3 jobs per million dollars that are created from the same spending on fossil-fuel industries. 3. The clean energy sector is growing at a rate of 8.3 percent. Solar thermal energy expanded by 18.4 percent annually from 2003 to 2010, along with solar photovoltaic power by 10.7 percent, and biofuels by 8.9 percent over the same period. Meanwhile, the U.S. wind energy industry saw 35 percent average annual growth over the past five years, accounting for 35 percent of new U.S. power capacity in that period, according to the 2010 U.S. Wind Industry Annual Market Report. As a whole, the clean energy sector’s average growth rate of 8.3 percent annually during this period was nearly double the growth rate of the overall economy during that time. 4. The production of cleaner cars and trucks is employing over 150,000 workersacross the United States today. These job numbers are likely to increase as improved car and light truck standards recently announced by President Barack Obama will require more skilled employees and encourage further investment. 5. Median wages are 13 percent higher in green energy careers than the economy average. Median salaries for green jobs are $46,343, or about $7,727 more than the median wages across the broader economy. As an added benefit, nearly half of these jobs employ workers with a less than a four-year college degree, which accounts for a full 70 percent of our workforce. 6. Green jobs are made in America, spurring innovation with more U.S. content than other industries. Most of the products used in energy efficiency retrofits are more than 90 percent made in America. Sheet metal for ductwork is over 99 percent domestically sourced, as are vinyl windows (98 percent) and rigid foam insulation (more than 95 percent). Even major mechanical equipment such as furnaces (94 percent) and air conditioning and heat pumps (82 percent) are predominantly American made. 7. We have a positive trade balance in solar power components such as photovoltaic components and solar heating and cooling components of $1.9 billion, and are exporting components to China. Contrast this with the oil industry, where in 2010 alone we imported over $250 billion in petroleum-related products. As our nation’s basic manufacturing base declines, we risk losing our place in the forefront of innovation if we don’t invest in advanced manufacturing in the green sector. 8. Three separate programs for energy efficiency retrofits have employed almost 25,000 Americans in three months. The Weatherization Assistance Program, Energy Efficiency Block Grant Program, and State Energy Programs have collectively upgraded over half a million buildings since the programs began to ramp up from April 1, 2011 and June 30, 2011, providing immediate new and sustainable job opportunities to tens of thousands of construction workers eagerly searching for work. 9. Clean energy jobs are better for U.S. small businesses. Specialty construction companies that perform energy retrofits show very high rates of small business participation in the construction. Ninety-one percent of the firms involved in retrofits are mall businesses with less than 20 employees. 10. An abundance of jobs in the green sector are manufacturing jobs with anupward career track. Forty-one percent of the nation’s green jobs offer medium to long-term career building and training opportunities, and 26 percent of green jobs are in the manufacturing sector, compared to 9 percent in the traditional economy. The bottom line: Green jobs being created through smart investments in our energy infrastructure are expanding employment opportunities while reducing pollution of our air and water, providing an alternative to foreign oil, and allowing us to export more American-made goods abroad.

### AT: Econ Advantage – CCS Raises Electricity Prices

#### CCS raises electricity prices

EJLFCC 8

Environmental Justice Leadership Forum on Climate Change, The Fallacy of Clean Coal, http://www.jtalliance.org/docs/Fallacy\_of\_Clean\_Coal.pdf

A tremendous amount of money and ingenuity would be necessary to make CCS a viable solution at the scale needed (assuming that is even technologically possible). 32 At least a percentage of that cost would inevitably be passed down to consumers, to the particular detriment of low-income communities already suffering from increased energy costs. The true impact of this cost increase is still unknown. The IPCC estimates that CCS could cause electricity prices to increase between 21 and 91 percent. 33

#### Either it raises prices or it doesn’t solve

Heinberg, 10 – fellow at the Post Carbon Institute, fellow at the Committee on International Trade and advisor to the European Parliament, National Petroleum Council, and the U.S. Secretary of Energy, (Richard, “China's Coal Bubble...and how it will deflate U.S. efforts to develop "clean coal”, Post Carbon Institute, May 4, 2010, http://www.postcarbon.org/article/96251-china-s-coal-bubble-and-how-it-will)//JK

Implication for the U.S.: Forget "Clean Coal"   Now: what does any of this have to do with "clean coal" technology?   Also known as Carbon Capture and Sequestration (CCS), "clean coal" is touted as the solution to one of the biggest conundrums facing industrial civilization in the 21st century: how to reduce greenhouse gas emissions and thus prevent catastrophic climate change, while maintaining growth in energy supplies and therefore in economic activity. Since nobody in a position of authority can seemingly figure out how to maintain economic growth while cutting coal out of the energy equation globally, and since nearly everyone assumes coal will remain cheap and abundant far into the foreseeable future, the obvious answer to the dilemma is to find a way to continue burning increasing amounts of coal while keeping the resulting CO2 from going into the atmosphere.   We know this can be done—on a small scale. All of the elements of the technology are already working in various pilot projects. Oil companies already inject carbon dioxide into oil wells to increase production. Pipelines, compressors, pumps—none of these requires quantum physics. There are two hitches: the difficulty of scaling up such an enterprise, and its impact on electricity prices. As many analysts have pointed out, the sheer size of the proposed operation—if deployed nationally in the U.S. alone, let alone the entire world—will be mind-boggling. And the costs of all those pipelines, pumps, compressors, and new coal gasification power plants (these are needed because it's really difficult and expensive to add CCS onto existing pulverized coal burning power plants) add up quickly and steeply. Every energy analyst agrees that this will boost the cost of electricity. Still, the scheme might just barely work—as long as coal prices remain constant.   However, add much higher coal prices to the equation and the result is electricity costs that will significantly dampen economic growth, make other energy sources comparatively more economically viable—or both. Conclusion: "clean coal" is an idea whose time will never come. Now, there are other reasons for assuming that U.S. coal prices will be higher in a decade or so than they are now. Official estimates of U.S. coal reserves are probably inflated, and domestic supply problems could start to appear sooner than most energy analysts are willing to admit. Moreover, America's coal transport infrastructure could be hobbled by higher diesel prices if world oil production goes into decline soon (as increasing numbers of analysts foresee), since transport costs often account for the lion's share of the delivered price of coal. But even if we ignore those looming systemic limits and consider only the implications of China's growing demand for coal imports, it's clear that U.S. coal prices can go nowhere but up. The only thing likely to keep them from doing so would be a collapse of the Chinese—and the global—economy.

### AT: Econ Advantage – No Regs

#### The GOP will crush congressional legislation

Hargreaves, 10 – staff writer, CNN News and CNN Money (Steve, “GOP ready to fight over global warming”, CNN News, November 22, 2010, http://money.cnn.com/2010/11/22/news/economy/epa\_global\_warming\_republicans/index.htm)//JK

NEW YORK (CNNMoney.com) -- It's no secret that many Republicans are deeply skeptical of global warming. "The earth will end only when God decides it's time to be over," Rep. John Shimkus, R-Ill., said while quoting the Bible in a House hearing last year. "This earth will not be destroyed by a flood." Shimkus is now one of four contenders to head the House Committee on Energy and Commerce when the Republicans take the reins in January. Also vying for the leadership post: Rep. Joe Barton of Texas, who apologized to BP for what he called a White House "shakedown" when it agreed to establishing the $20 billion Gulf oil spill trust fund; Rep. Cliff Stearns of Florida, who wants to open up Alaska's wildlife refuge to drilling; and Michigan's Fred Upton. Upton is considered the front-runner and probably the most moderate of the bunch. He has vowed to eliminate an offshoot of the committee, the House Select Committee on Energy Independence and Global Warming. "The American people do not need Congress to spend millions of dollars to write reports and fly around the world," Upton wrote in a recent editorial. "We must terminate this wasteful committee." The new Congress is not expected to do much on the energy front. A broad plan to regulate greenhouse gas emissions and use the revenue to fund alternative energy -- known as cap-and-trade -- is dead. A spokesman for presumed Speaker of the House John Boehner said Republicans support all forms of energy development, includingrenewables and nuclear power. But he said any money for them must come from expanded domestic oil and gas drilling -- a prospect that also looks dim given the concerns raised by the BP spill. Target: EPA But there is one thing the newly empowered Republicans are sure to go after: the Environmental Protection Agency. When Obama was pushing his cap-and-trade plan last year, the EPA was quietly working on the sidelines to draft up rules to limit greenhouse gas emissions. Heavily targeted would be power plants, refineries, and heavy industries such as steel and concrete. The EPA was under court order to do so, having lost a Supreme Court challenge by the state of Massachusetts under the Bush administration. The high court said that if EPA classified greenhouse gases as a public health threat, which it did, then it must regulate them. Obama and his advisers claimed they didn't want EPA to regulate greenhouse gases, preferring instead to get the job done with a Congress-approved cap-and-trade plan. But many analysts saw EPA's moves as an implicit threat to lawmakers: pass cap-and-trade or else deal with EPA. But cap-and-trade failed. Now the Republicans -- along with many coal-state Democrats -- are scrambling to stop the "or else" part of that equation. "Unquestionably, there will be more oversight of the EPA," said Roger Patrick, an environmental lawyer at Mayer Brown. "The president might even sign a bill to limit EPA's authority." Republican lawmakers have made their intent clear. "The EPA is working on a regulatory train wreck," wrote Upton. "If the EPA continues unabated, jobs will be shipped to China and India as energy costs skyrocket." Obama has been a bit more ambiguous. In a speech following the big Democratic losses this past election day, the president said, "I think EPA wants help from the legislature on this. I don't think that, you know, the desire is to somehow be protective of their powers here."

Congress will keep the EPA from regulating

Kerpen ’11-vice president for policy at Americans for Prosperity (Phil, “Hooray for the U.S. House for Standing Up to Regulatory Tyranny on Cap-and-Trade and Net Neutrality”, Fox news, 3/14/11, http://www.foxnews.com/opinion/2011/03/14/phil-kerpen-house-stands-regulatory-tyrrany/)

With the Republican House putting the brakes on Obama's continued pursuit of a "fundamental transformation" of America through the legitimate legislative process, action has shifted to the regulatory realm, where this administration is aggressively pursuing its agenda. Unelected regulators are usurping the legislative power that the people, in the Constitution, granted to Congress. Just as judicial tyranny (judges usurping legislative power) has been a major and well-founded concern of activists for decades, Congress must step in and stop this regulatory tyranny. Fortunately, the House Energy and Commerce Committee will begin action today to stop two of the most egregious regulatory power grabs of this administration. As documented at www.ObamaChart.com, the EPA's global warming regulations and the FCC's Internet regulations. President Obama is now pursuing his entire failed global warming agenda - decisively rejected as the cap-and-tax bill and in the 2010 election. In Obama's words: "Cap-and-trade was just one way of skinning the cat; it was not the only way." Indeed, the EPA is actively pursuing a bizarre legal theory that the 1970 Clean Air Act was designed as a global warming law, and that pursuant to it they can regulate just about everything that moves, as well as most industrial facilities. When it's fully phased in, their plans include over 18,000 pages of appendices that would regulate every industry in the U.S., cause electricity prices to skyrocket, and greatly diminish our freedom and prosperity. On the FCC side, President Obama's close friend Julius Genachowski has been running the supposedly independent agency as an extension of the White House, pursuing so-called "net neutrality" regulations to give the FCC a toehold over regulating broadband Internet access despite the fact those regulations were rejected by Congress (where they had almost no support), the American people, and the courts. In the 2010 election, there were 95 candidates who campaigned on supporting net neutrality, and all 95 lost. --Yet the FCC insisted on moving forward anyway, on a 3-to-2 party-line vote on December 21, 2010. Both of these regulatory power grabs are now in Congress's sights for overturning, starting today in the House Energy and Commerce Committee, which is marking up two measures: H.R. 910 to stop the EPA and H.J. Res. 37 to stop the FCC. H.R. 910 is a good and important bill that stops the misuse of the Clean Air Act as a global warming law, but the greens have many other angles on skipping Congress to force global warming regulations - including the absurd claim that the polar bear, now at a record high population, is endangered. Congress should therefore go further than H.R. 910 and also enact H.R. 750, Tim Walberg's bill that blocks any regulator from acting on global warming unless, and until, Congress expressly gives them that authority. Both of these EPA pre-emption vehicles will face an uphill fight in the Senate, but there are enough in-cycle Democrats - including many from energy states - who need to stand up for their constituents, even in the face of political pressure from the White House and the green pressure groups. The 60 votes needed in the Senate will not be impossible, and a strong push now in the House will set the stage. On the FCC side, the prospects for H.J. Res. 37 and its companion S.J. Res. 6 in the Senate are much brighter, because it requires only 51 votes, not 60, to pass the Senate. As a Congressional Review Act resolution, the overturn of the FCC's Internet regulations will not be subject to filibuster. That means if just four Senate Democrats join all 47 Republicans they can put Obama to the test, and see if he is so blindly committed to regulating the Internet - without regard for the legitimate legislative process - that he will use his veto to force the regulations to stand. These House votes in committee - and later on the floor - will tell us which members of Congress are serious about listening to the voters and taking their constitutional responsibility to write the laws seriously. Voting no on these measures indicates not just support for these misguided big government policies, but a complete disregard for the legitimate legislative process. That disregard begs a question - if we elect legislators who sit on their hands while unelected regulators usurp their power and make all of the real decisions, don't we need to demand better as citizens and voters?

Congress is blocking EPA regulation

ICIS 6/19-(“US House leaders seek to Rollback Greenhouse Gas Rules”, ICIS news, 6/19/2012, http://www.icis.com/searchresults/?key=US%20house%20leaders%20seek%20to%20rollback%20greenhouse&filter=16&page=1&searchType=Free%20Text%20Search/)

WASHINGTON (ICIS)--House committee leaders on Tuesday charged that Obama administration efforts to regulate greenhouse gases (GHG) emissions constitute overreach and a violation of congressional intent that will undermine US manufacturing and raise electricity costs. In a hearing on various ongoing efforts by the Environmental Protection Agency (EPA) to restrict US emissions of greenhouse gases, Energy and Commerce Committee chairman Fred Upton (Republican-Michigan) said those policies are “acting as one more roadblock to economic recovery and job growth”. “It’s a sad irony that the very job creating activities this struggling economy screams out for – things like building a new factory or expanding an existing one, or boosting electric generating capacity to meet demand – are precisely what is being targeted by EPA with these burdensome GHG permit requirements,” Upton said. Upton was referring to a series of EPA regulations issued since 2009 that limit emissions of carbon dioxide (CO2) and other greenhouse gases from automobiles and trucks and, more recently, impose strict limits on releases of GHGs by power plants, chemical facilities and other manufacturing industries. Congressman Ed Whitfield (Republican-Kentucky), chairman of the House Subcommittee on Energy and Power, said EPA’s greenhouse gases restrictions “are a backdoor cap and tax policy that Congress has already rejected”. The US House passed a cap-and-trade climate bill in late 2009 on a one-vote majority when the chamber was under Democrat control.  But a companion bill died in the Senate the following year, and in the 2010 congressional elections Republicans won a majority in the House. “Any action regarding climate change should rest with Congress and not unelected and unaccountable bureaucrats at EPA,” said Whifield. The US chemicals sector, along with a broad spectrum of other manufacturers, opposed congressional efforts to pass a cap-and-trade GHG emissions control bill, arguing that such a law would force still more US manufacturers overseas. “At a time of chronically high unemployment, the last thing job creating industries need is more red tape,” said Whitfield. “But that is precisely what EPA is imposing on the economy with its greenhouse gas regulations,” he said. Since 2009, when President Barack Obama took office, he said, “EPA has already published ... more than 1,800 pages of final rules relating to greenhouse gases, and more than 700 pages of proposed rules are pending”, he added. Whitfield noted that EPA was invited to attend the hearing of his subcommittee, but the agency did not send a representative. Upton said he hoped testimony heard at Tuesday’s hearing would help build support for a House-approved bill, HR-910, that would roll-back the bulk of EPA’s greenhouse gases initiatives. That bill would essentially revoke EPA’s authority to regulate GHG, rescind those GHG-related actions already taken, and bar the agency from regulating carbon-dioxide in the future. The measure passed in the House in April 255 to 172 – largely in a party-line vote but with help from 19 Democrats – and is now pending in the Senate. Advocates of the legislation say it is not likely to pass in the Democrat-majority Senate but that it might have a better chance if the upcoming November US general elections should shift the balance of power in the White House and Senate.

Courts are blocking EPA regulation

Associated Press 6/23 (“Court Blocks EPA Rules for Oklahoma Power Plants”, Business Week, 6/23/2012, http://www.businessweek.com/ap/2012-06-23/court-blocks-epa-rules-for-oklahoma-power-plants)

OKLAHOMA CITY (AP) — A federal appeals court has blocked enforcement of an Environmental Protection Agency plan that would reduce pollution from Oklahoma's coal-fired power plants. The 10th U.S. Circuit Court of Appeals on Friday granted a request by the Attorney General Scott Pruitt, Oklahoma Gas and Electric Co. and others for a stay pending a review of the EPA's rule requiring the reduction of sulfur dioxide emissions at four electric generating units. The EPA's plan is designed to reduce pollution from coal-fired power plants and industrial sources to improve visibility at federally managed wilderness areas, including the 59,000-acre Wichita Mountain Wildlife Refuge near Lawton. It would affect plants operated by OG&E at Red Rock and Muskogee and another operated by Public Service Co. of Oklahoma at Oologah. Those three facilities, built more than 30 years ago, are responsible for more than one-third of the sulfur dioxide pollution emitted by all industrial and utility sources in the state, according to the EPA. The EPA accepted most of Oklahoma's plan for targeting the haze, but it also wanted the utilities to retrofit power plants with technology to reduce pollution. Pruitt, citing data from the utilities, has said the cost of installing that technology could cause consumer electricity rates to rise more than 13 percent over the next three years. On Friday, he called the appeals decision "a significant victory" for Oklahoma. "The EPA exceeded its authority under the Clean Air Act, and we will continue to challenge that decision to preserve the ability of Oklahoma stakeholders to create an Oklahoma solution," Pruitt said in a statement.

#### Courts and states won’t follow EPA regulations

NYT, 10 (E.P.A. Limit on Gases to Pose Risk to Obama and Congress”, The New York Times, December 30, 2010, http://www.nytimes.com/2010/12/31/science/earth/31epa.html?pagewanted=all)//JK

But the reaction in Congress and industry has been outsized, with some likening the E.P.A. to terrorists and others vowing to choke off the agency's financing for all air-quality regulation. A dozen states have filed suit to halt the new greenhouse gas rules, with one, Texas, flatly refusing to comply with any new orders from Washington. Two federal courts, including one this week in Louisiana, have refused to issue restraining orders halting the implementation of the new rules. But late Thursday, a federal appeals court in Washington temporarily blocked the the E.P.A. from enforcing its rules in Texas while the courts consider whether the federal agency has the right to take over the Texas program. The courts have not yet ruled on the legality of the broader federal program. Representative Fred Upton, the Michigan Republican who is set to become chairman of the powerful House Energy and Commerce Committee, said he was not convinced that greenhouse gases needed to be controlled or that the E.P.A. had the authority to do so.

### AT: Warming – CCS Doesn’t Solve

**No tech for at least 40 years—too late to solve warming**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**CCS cannot deliver in time to save the climate**

**Every decision made about new power plants today will influence the energy mix of the next 30-40 years.** The urgency of the climate crisis means **solutions must be ready for large-scale deployment in the short-term. CCS simply cannot deliver in time.** While some system components of CCS are already in commercial use – mostly in the oil and gas industry“**there is no operational experience with carbon capture from coal plants and certainly not with an integrated sequestration operation”**.78 While plans for demonstration facilities are underway, it is believed that **the earliest CCS might become feasible is 2030.**79 The UNDP concludes that **CCS “will arrive on the battlefield far too late to help the world avoid dangerous climate change.**”80

**Doesn’t capture enough CO2**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**Assuming that commercial viability is reached, scenario studies indicate that by 2050 only 20-40% of global fossil fuel CO2 emissions could be technically suitable for capture.** This includes 30-60% of emissions from the power sector.66 Therefore, **up to 70% of emissions from electricity generation in 2050 may not even be technically suited to CCS.**

**Status quo solves warming—plan prevents solutions**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**The world already has the solutions to the climate crisis**

**Investment in CCS risks locking the world into an energy future that fails to save the climate. Those technologies with the greatest potential to provide energy security and reduce emissions, and to provide renewable energy and energy efficiency, need to be prioritised.**

Greenpeace’s Energy [R]evolution blueprint shows how **renewable energy,** combined with greater energy efficiency, **can cut global CO2 emissions by almost 50%,** and deliver half the world’s energy needs by 2050.40 The renewable energy market is booming; in 2007, global annual investment in renewables exceeded US$100 billion.41 **Decades of technological progress have seen renewable energy technologies** such as wind turbines, solar photovoltaic panels, biomass power plants and solar thermal collectors **move steadily into the mainstream. The same climate decision-makers who were sceptical about CCS believed far more in the ability of renewable technologies** to deliver reductions in greenhouse gas emissions: 74% expressed confidence in solar hot water, 62% in offshore wind farms, and 60% in onshore wind farms.42**Investment in CCS risks locking the world into an energy future that fails to save the climate. Those technologies with the greatest potential to provide energy security and reduce emissions, and to provide renewable energy and energy efficiency, need to be prioritised.**

**Many nations have recognised the potential of these true climate solutions and are pressing ahead with ambitious plans for energy revolutions within their borders.** New Zealand plans to achieve carbon neutrality by midcentury. **Renewable energy and energy efficiency, not CCS, are leading the way.** New Zealand already obtains 70% of its electricity from renewable resources and aims to increase it to 90% by 2025.43 In Germany, renewable energy use has increased 300% in the past 10 years. In the US, over 5,200 megawatts (MW) of wind energy were installed in 2007, accounting for 30% of new power installed that year; an increase of 45% in one year.44

**The urgency of the climate crisis means solutions must be ready for large-scale deployment in the short-term. CCS simply cannot deliver in time. The technology is highly speculative, risky and unlikely to be technically feasible in the next twenty years.** Letting CCS be used as a smokescreen for building new coal-fired power stations is unacceptable and irresponsible. **“Capture ready” coal plants pose a significant threat to the climate.**

**The world can fight climate change but only if it reduces its dependence on fossil fuels, particularly coal. Renewable energy and energy efficiency are safe, costeffective solutions that carry none of the risks of CCS, and are available today to cut emissions and save the climate.**

**CCS is expensive and prevents solutions to warming**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**CCS is expensive and undermines funding for sustainable solutions**

While cost estimates for CCS vary considerably, one thing is certain – it is extremely expensive.

**CCS will require significant funding to construct the power station and necessary infrastructure to transport and store carbon.** Existing policy mechanisms, such as a price on carbon, would need to be significantly increased (by as much as five times higher than their current levels) and supplemented by additional policy commitments and financial incentives.25

The US Department of Energy (US DOE) calculates that **installing carbon capture systems will almost double plant costs.**26 This will lead to electricity price hikes of anywhere between 21 and 91%.27

**Providing the substantial levels of support needed to get CCS off the ground comes at the expense of real solutions.** Current research shows **electricity generated from coal-fired power stations equipped with CCS will be more expensive than other less-polluting sources, such as wind power and many types of sustainable biomass.**28

**CCS doesn’t solve warming—takes too long**

**Rochon et al 08** Peer Reviewed, Greenpeace International: Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace, Authors include: Dr Erika Bjureby, Dr Paul Johnston, Robin Oakley, Dr David Santillo, Nina Schulz, Dr Gabriela von Goerne(Emily, May 2008, “False Hope: Why carbon capture and storage won’t save the climate,” [http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%92t%20save%20the%20climate.pdf)//DR](http://www.probeinternational.org/False%20Hope%20--%20Why%20carbon%20capture%20and%20storage%20won%EF%BF%BDt%20save%20the%20climate.pdf%29//DR). H

**The climate crisis requires urgent action.** Climate scientists warn that to avoid the worst effects, **global greenhouse gas emissions must peak by 201**5 and then start falling by at least 50% by 2050, compared to 1990 levels. C**oal is the most polluting of all fossil fuels, and the single greatest threat to the climate. If current plans to invest hundreds of billions of dollars in coal plants are realised, CO2 emissions from coal could increase 60% by 2030. Concerns about the feasibility, costs, safety, and liability of CCS make it a dangerous gamble. A survey of 1000 “climate decision-makers and influencers**” around the world **reveals substantial doubt in the ability of CCS to deliver. Just 34% were confident that** retrofitting **‘clean coal technology’** to existing power plants **could reduce CO2 emissions** over the next 25 years **without unacceptable side effects, and only 36% were confident in its ability to deliver low-carbon energy from new power stations.5**

### AT: Warming – Inevitable/Can’t Solve—1NC

#### Can’t solve warming

Hamilton 10 – Professor of Public Ethics @ ANU

Clive Hamilton, Professor of Public Ethics in Australia, 2010, “Requiem for a Species: Why We Resist the Truth About Climate Change,” pg 27-28

The conclusion that, **even if we act promptly and resolutely**, the world is on a path to reach 650 ppm is almost too frightening to accept. That level of greenhouse gases in the atmosphere will be associated with warming of about 4°C by the end of the century, well above the temperature associated with tipping points that would trigger further warming.58 So it seems that even with the most optimistic set of assumptions—the ending of deforestation, a halving of emissions associated with food production, global emissions peaking in 2020 and then falling by 3 per cent a year for a few decades—**we have no chance** of preventing emissions rising well above a number of critical tipping points that will spark uncontrollable climate change. The Earth's climate would enter a chaotic era lasting thousands of years before natural processes eventually establish some sort of equilibrium. Whether human beings would still be a force on the planet, or even survive, is a moot point. One thing seems certain: there will be far fewer of us. These conclusions arc alarming, co say the least, but they are not alarmist. Rather than choosing or interpreting numbers to make the situation appear worse than it could be, following Kevin Anderson and Alice Bows 1 have chosen numbers that err on the conservative side, which is to say numbers that reflect a more buoyant assessment of the possibilities. A more neutral assessment of how the global community is likely to respond would give an even bleaker assessment of our future. For example, the analysis excludes non-CO2, emissions from aviation and shipping. Including them makes the task significantly harder, particularly as aviation emissions have been growing rapidly and are expected to continue to do so as there is no foreseeable alternative to severely restricting the number of flights.v' And any realistic assessment of the prospects for international agreement would have global emissions peaking closer to 2030 rather than 2020. The **last chance to reverse the trajectory of global emissions** by 2020 **was forfeited** at the Copenhagen climate conference in December 2009. As a consequence, a global response proportionate to the problem was deferred for several years.

### AT: Warming – Inevitable/Can’t Solve—Studies Confirm

#### Warming inevitable even if we cut emissions to zero—multiple studies confirm

Gillett et al 10—director @ the Canadian Centre for Climate Modelling and Analysis

Nathan, “Ongoing climate change following a complete cessation of carbon dioxide emissions”. *Nature Geoscience*

Several recent studies have demonstrated that CO2-induced 17 global mean temperature change is irreversible on human 18 timescales1\_5. We find that not only is this climate change 19 irreversible, but that for some climate variables, such as Antarctic 20 temperature and North African rainfall, CO2-induced climate 21 changes are simulated to continue to worsen for many centuries 22 even after a complete cessation of emissions. Although it is 23 also well known that a large committed thermosteric sea level 24 rise is expected even after a cessation of emissions in 2100, 25 our finding of a strong delayed high-latitude Southern Ocean 26 warming at intermediate depths suggests that this effect may be 27 compounded by ice shelf collapse, grounding line retreat, and ensuing accelerated ice discharge in marine-based sectors of the 28 Antarctic ice sheet, precipitating a sea level rise of several metres. 29 Quantitative results presented here are subject to uncertainties 30 associated with the climate sensitivity, the rate of ocean heat 31 uptake and the rate of carbon uptake in CanESM1, but our 32 findings of Northern Hemisphere cooling, Southern Hemisphere 33 warming, a southward shift of the intertropical convergence zone, 34 and delayed and ongoing ocean warming at intermediate depths 35 following a cessation of emissions are likely to be robust. Geo- 36 engineering by stratospheric aerosol injection has been proposed 37 as a response measure in the event of a rapid melting of the 38 West Antarctic ice sheet24. Our results indicate that if such a 39 melting were driven by ocean warming at intermediate depths, as 40 is thought likely, a geoengineering response would be ineffective 41 for several centuries owing to the long delay associated with 42 subsurface ocean warming.

### AT: Warming – Inevitable/Can’t Solve—Time Gap

#### 30 year time gap prevents solving warming – any effect takes decades

Walker and King 8—Director of the School of Environment @Oxford

Gabrielle, PhD in Chemistry, Sir David, Director of the Smith School of Enterprise and the Environment at the University of Oxford, and a senior scientific adviser to UBS, The Hot Topic, pg. 47

Most people have now realized that climate change is upon us. If pushed, most would probably say that if we don’t do something to change the way we live, things are more likely to get worse. But few seem to have noticed one of the most important points to emerge from the last few years of scientific projections. All the evidence suggests that the world will experience significant and potentially highly dangerous changes in climate over the next few decades no matter what we do now. That’s because the ocean has a built in lag. It takes time to heat up, which is why the nicest time to swim is often the end of the summer rather than the middle. The same principle holds for global warming, but on a longer timescale: Because the oceans gradually soak up heat generated by the extra greenhouse gases, the full effect won’t be felt for decades to centuries. This means that whatever we do now to change our carbon habits will take several decades to have any effect. In other words, according to our most sophisticated models, the next twenty to thirty years will be more or less the same whether we quickly kick the carbon habit or continue burning as many fossil fuels as we can. Whatever we do today to reduce emissions will matter for our children’s generation and beyond, but not for our own. The problem of climate change is one of legacy.

### AT: Warming– No Warming

#### No warming—we’ve entered a 30 year period of cooling—proved by PDOs

\*\* PACIFIC DECADAL OSCILLATION

Easterbrook 10—geology professor specializing in climate effects

(Don, g[eology](http://en.wikipedia.org/wiki/Geology) professor emeritus at [Western Washington University](http://en.wikipedia.org/wiki/Western_Washington_University) [http://myweb.wwu.edu/dbunny/research/global/easterbrook\_climate-cycle-evidence.pdf] EVIDENCE OF THE CAUSE OF GLOBAL WARMING AND COOLING: RECURRING GLOBAL, DECADAL, CLIMATE CYCLES RECORDED BY GLACIAL FLUCTUATIONS, ICE CORES, OCEAN TEMPERATURES, HISTORIC MEASUREMENTS AND SOLAR VARIATIONS)

‘Global warming’ (the term used for warming from 1977 to 1998) is over. No warming above the level temperatures in 1998 has occurred and global cooling has deepened since 2005 (Fig. 24). Switching of the PDO back and forth from warm to cool modes has been documented by NASA’s satellite imagery (Figs. 25, 26). The satellite image from 1989 is typical of the warm mode (1945-1977) with most of the eastern Pacific adjacent to North America showing shades of yellow to red, indicating warm water. The satellite image from 1999 (Fig. 27) shows a strong contrast to the 1997 image, with deep cooling of the eastern Pacific and a shift from the PDO warm to the PDO cool mode. This effectively marked the end of ‘global warming’ (i.e., the 1977 to 1998 warm cycle). Figures 27–30 show that the switch of the PDO from its warm cycle to the present cool cycle has become firmly established. Each time this has occurred in the past century, global temperatures have remained cool for about 30 years (Fig. 31). Thus, the current sea surface temperatures not only explain why we have had global cooling for the past 10 years, but also assure that cool temperatures will continue for several more decades.

#### Cooling is coming now – it’s fast and outweighs the effects of warming

Carlin 11 – PhD in Economics from MIT

Alan Carlin, PhD in Economics, former Director @ EPA and fellow @ RAND, 3-2011, “ A Multidisciplinary, Science-Based Approach to the Economics of Climate Change,” International Journal of Environmental Research and Public Health, Vol. 8

On the contrary, the evidence is that during interglacial periods over the last 3 million years the risks are on the temperature downside, not the upside. As we approach the point where the Holocene has reached the historical age when a new ice age has repeatedly started in past glacial cycles, this appears likely to be the only CAGW effect that mankind should currently reasonably be concerned about. Earth is currently in an interglacial period quite similar to others before and after each of the glacial periods that Earth has experienced over the last 3 million years. During these interglacial periods there is currently no known case where global temperatures suddenly and dramatically warmed above interglacial temperatures, such as we are now experiencing, to very much warmer temperatures. There have, of course, been interglacial periods that have experienced slightly higher temperatures, but none that we know of that after 10,000 years experienced a sudden catastrophic further increase in global temperatures. The point here is that there does not appear to be instability towards much warmer temperatures during interglacial periods. There is rather instability towards much colder temperatures, particularly during the later stages of interglacial periods. In fact, Earth has repeatedly entered new ice ages about every 100,000 years during recent cycles, and interglacial periods have lasted about 10,000 years. We are currently very close to the 10,000 year mark for the current interglacial period. So if history is any guide, the main worry should be that of entering a new ice age, with its growing ice sheets, that would probably wipe out civilization in the temperate regions of the Northern Hemisphere—not global warming. The economic damages from a new ice age would indeed be large, and almost certainly catastrophic. Unfortunately, it is very likely to occur sooner or later.

#### No scientific support for global warming hypothesis

Armstong 11 – Professor @ U Wharton School

J. Scott Armstrong, Professor of Marketing specializing in forecasting technology, 3-31-2011, “Climate Change Policy Issues,” CQ Congressional Testimony, Lexis

Global warming alarmists have used improper procedures and, most importantly, have violated the general scientific principles of objectivity and full disclosure. They also fail to correct errors or to cite relevant literature that reaches conclusion that are unfavorable. They also have been deleting information from Wikipedia that is unfavorable to the alarmists' viewpoint (e.g., my entry has been frequently revised by them). These departures from the scientific method are apparently intentional. Some alarmists claim that there is no need for them to follow scientific principles. For example, the late Stanford University biology professor Stephen Schneider said, "each of us has to decide what is the right balance between being effective and being honest." He also said "we have to offer up scary scenarios" (October 1989, Discover Magazine interview). Interestingly, Schneider had been a leader in the 1970s movement to get the government to take action to prevent global cooling. ClimateGate also documented many violations of objectivity and full disclosure committed by some of the climate experts that were in one way or another associated with the IPCC. The alarmists' lack of interest in scientific forecasting procedures and the evidence from opinion polls (Pew Research Center 2008) have led us to conclude that global warming is a political movement in the U.S. and elsewhere (Klaus 2009). It is a product of **advocacy**, **rather than of the scientific testing** of multiple hypotheses.

### AT: Warming– No Modeling – China

#### No modeling in China – it’s structurally impossible

Downs 8

Eric, Fellow @ Brookings, China Energy Fellow, Foreign Policy, John L. Thornton China Center U.S.-China Economic & Security Review Commission, China’s Energy Policies and Their Environmental Impacts, http://www.brookings.edu/testimony/2008/0813\_china\_downs.aspx

China suffers from a disconnect between the increasingly prominent position of energy issues on its domestic and foreign policy agendas and the capacity of the country’s institutions to manage the energy sector. Some Chinese commentators have even argued that the biggest threat to China’s energy security is posed by the very institutions responsible for enhancing it. Consequently, restructuring China’s energy policymaking apparatus has been a subject of intense debate in recent years as the country has grappled with an unexpected surge in energy demand, growing dependence on energy imports, rising global energy prices and periodic domestic energy supply shortages. Authority over China’s energy sector at the national level is fractured among more than a dozen government agencies, the most important of which is the National Development and Reform Commission (NDRC). Within the NDRC itself, responsibility for energy is similarly scattered among multiple departments. Prior to the restructuring in March 2008, the key component was the Energy Bureau, which had a broad mandate but lacked the authority, tools and manpower to fulfill it. In 2005, the government added another cook to the kitchen with the establishment of the National Energy Leading Group, an advisory body headed by Premier Wen Jiabao. While the leading group’s creation reflected recognition of the need to strengthen energy sector management, it did not eradicate China’s energy governance woes. China’s fragmented energy policymaking structure has impeded energy governance because there is no single institution, such as a Ministry of Energy, with the authority to coordinate the interests of the various stakeholders. For example, the implementation of energy laws is hampered by the fact that those laws often do not specify the government agencies responsible for implementation because of disputes over who should be in charge. Similarly, the fuel tax that the NPC approved in 1999 has not been implemented because of the failure of the relevant stakeholders to reach an agreement. The policy paralysis within the energy bureaucracy stands in sharp contrast to the activism of China’s state-owned energy companies. These firms are powerful and relatively autonomous actors. Their influence is derived from their full and vice ministerial ranks, the membership of some top executives in the Central Committee of the Chinese Communist Party, industry expertise, internationally listed subsidiaries and profitability (at least until recently). More often than not, it is China’s energy firms who initiate major energy projects and policies that are later embraced by the government, such as the West-East Pipeline and the acquisition of foreign energy assets. The companies also have some capacity to advance corporate interests at the expense of national ones. For example, oil and power generating companies have periodically reduced their output to pressure the government to raise the state-set prices of refined products and electricity, which have not kept pace with increases in the market-determined prices of crude oil and coal. Similarly, China’s national oil companies have ignored guidance from the central government about where they should invest overseas. II. China’s “new” energy policymaking structure The recent changes to China’s energy policymaking apparatus are the latest in a series of institutional reforms aimed at improving energy governance. In March 2008, the NPC approved two additions to China’s energy bureaucracy – the State Energy Commission (SEC) and the National Energy Administration (NEA). The SEC, a high-level discussion and coordination body whose specific functions, organization and staffing have not yet been determined, will replace the National Energy Leading Group. The daily affairs of the SEC will be handled by the NEA, a vice-ministerial component of the NDRC, which is the successor to the NDRC’s Energy Bureau. In addition to the Energy Bureau, the NEA is also comprised of other energy offices from the NDRC, the Office of the National Leading Group, and the nuclear power administration of the Commission of Science, Technology and Industry for National Defense. The NEA has a broad mandate, which includes managing the country’s energy industries, drafting energy plans and policies, negotiating with international energy agencies and approving foreign energy investments. The NEA, like its predecessor, will struggle to fulfill its mandate because it lacks the authority, autonomy, manpower and tools to deal with the country’s energy challenges. Although the NEA’s capabilities in each of these areas are greater than those possessed by the NDRC Energy Bureau, they still fall short of what the NEA needs to do its job. Authority: The NEA has more political clout than its predecessor, but not enough to mitigate the bureaucratic infighting that undermines energy decision-making. The NEA is a vice-ministerial body, which is a step above that of the Energy Bureau, which was a bureau-level organization. However, the NEA still does not have the authority it needs to coordinate the interests of ministries, commissions and state-owned energy companies. One of the frustrations of officials in the NDRC Energy Bureau was that the energy companies often undercut their authority by circumventing the Bureau to hold face-to-face discussions with China’s senior leadership. The authority of the NEA is somewhat enhanced by the appointment of Zhang Guobao, a Vice-Chairman of the NDRC with full ministerial rank, as head of the NEA. While it was widely expected that Zhang would retire, his new position is a reflection of his substantial energy expertise. Zhang, who has worked at the NDRC since 1983, is a smart and skillful bureaucrat with encyclopedic knowledge of China’s energy sector. He has overseen the development of some of the country’s major infrastructure projects, including the West-East Pipeline, the transmission of electricity from west to east, the Qinghai-Tibet Railway and the expansion of Beijing Capital International Airport. Autonomy: The NEA is a creature of the NDRC. Some Chinese media reports speculated that the fact that the NEA’s offices will be separate from those of the NDRC and that the NEA will have its own Party Group – which will give the NEA greater autonomy in managing its affairs, including personnel decisions – are signs of the NEA’s independence. However, the fact that Zhang Guobao – an NDRC “lifer” – is head of the NEA and its Party Group indicates that the NEA’s room to maneuver will be constrained by the NDRC. Moreover, the NEA’s independence is limited by the fact that key tools it needs to effectively manage the energy sector are in the hands of the NDRC. Tools: Arguably the greatest constraint on the NEA’s ability to fulfill its mandate is the fact that is does not possess the authority to set energy prices, which remain the purview of the NDRC’s Pricing Department. The issue of who would end up with the power to determine energy prices was, in the words of Zhang Guobao, a subject of “constant dispute” during the bureaucratic reorganization. Although the NEA can make suggestions about energy price adjustments and should be consulted by the NDRC on any proposed changes, the shots are still being called by the NDRC (and ultimately the State Council, whose approval is needed for any major energy price changes). The fact that the NDRC retained control over energy prices is hardly surprising. The power to set prices is one of the NDRC’s main instruments of macroeconomic control, which it understandably is reluctant to relinquish, especially to a subordinate component which might be tempted to adjust energy prices in ways that run counter to broader NDRC objectives, such as combating inflation. The NEA’s lack of authority over energy prices makes its task of mitigating the current electricity shortages, which are partly rooted in price controls, especially challenging. Electricity prices are set by the state, while coal prices are determined by the market. The failure of electricity price increases to keep pace with soaring coal prices has contributed to the national power shortage because some electricity producers can't afford coal while others are unwilling to operate at a loss. With no pricing power, the NEA has little choice but to resort to administrative measures to achieve an objective that would be more effectively realized by raising and ultimately liberalizing electricity prices. Personnel: The central government is still managing the energy sector with a **skeleton crew**. Contrary to rumors that the NEA’s staff would be as large as 200, it ended up with just 112 people. This staff quota is certainly larger than that of the NDRC Energy Bureau, which had only 50 people, but it does not represent a major increase in the number of people directly involved in managing the energy sector at the national level. Moreover, some Chinese media reports have speculated that the NEA may face the problem of “too many generals and not enough soldiers” because at least half of the 112 slots at the NEA are for positions at the deputy department head level and above. The Party organ that determines the functions, internal structure and staff quotas for government institutions probably resisted calls for more personnel out of concern that if it approved a large staff for the NEA, then other government bodies would also press for more manpower at a time when the State Council is trying to streamline the bureaucracy. In sum, China’s new energy administration is unlikely to substantially improve energy governance. The organizational changes are tantamount to rearranging deck chairs on the Titanic. Although the energy bureaucracy looks a bit different, its limited capacities remain largely unchanged. Consequently, we can expect to see a continuation of business as usual: conflicts of interest will impede decision-making; the energy companies will remain important drivers of projects and policies; state-set energy prices will continue to contribute to periodic domestic energy supply shortfalls; and the NEA, with no authority to adjust energy prices, probably will resort to “second best” administrative measures to try to eradicate those shortages. The modest tinkering to China’s energy policymaking apparatus unveiled during the March 2008 NPC meeting reflects the conflicts of interest that stymie energy decision-making. Despite widespread recognition among Chinese officials and energy experts of the need to get the country’s energy institutions “right” and the growing chorus of voices calling for the establishment of a Ministry of Energy (MOE), there are powerful ministerial and corporate interests that favor the status quo. The opposition to the creation of a MOE, a hot topic of debate in Chinese energy circles in recent years, was led by the NDRC and the state-owned energy companies. The mere specter of a MOE strikes fear in the heart of the NDRC because it would deprive the NDRC of a substantial portion of its portfolio and important tools of macroeconomic control. The NDRC’s aversion is shared by the energy firms who are reluctant to have another political master and afraid that a MOE would limit their direct access to China’s leadership. Such opposition helps explain why the government was unable to forge a consensus in favor of more robust changes to China’s energy policymaking apparatus. Implications for the United States First, US policymakers should recognize that China’s fractured energy policymaking apparatus may constrain the Chinese government from doing all that US policymakers would like it to do – and indeed what Chinese leaders themselves might want to do – to enhance international energy security and combat climate change. If China falls short of our expectations it may not reflect a conscious decision by Beijing to shirk its global responsibilities but rather the limited capacity of its national energy institutions to bend other actors, notably firms and local governments, to its will.

### AT: Warming – Alt Caus – China

#### Can’t solve warming without China

Chen et al 10Chen, Qian, Peridas, Qiu, Ho: Natural Resources Defense Council, Friedmann: Lawrence Livermore National Laboratory, Li, Wei: Institute of Rock and Soil Mechanics, Chinese Academy of Sciences, Sung, Fowler: Clean Air Task Force, Seligsohn, Liu, Forbes: World Resources Institute, Zhang: China Tsinghua University, Zhao: Institute of Engineering Thermophysics, Chinese Academy of Sciences (Jason Chen, Jingjing Qian, George Peridas, Yueming Qiu, Bruce Ho, Julio Friedmann, Xiaochun Li, Ning Wei, S. Ming Sung, Mike Fowler, Deborah Seligsohn, Yue Liu, Sarah Forbes, Dongjie Zhang, Lifeng Zhao, December 2010, “Identifying Near-Term Opportunities For Carbon Capture and Sequestration (CCS) in China,” [http://docs.nrdc.org/international/files/int\_10121001a.pdf)//DR](http://docs.nrdc.org/international/files/int_10121001a.pdf%29//DR). H

As discussed at the beginning of this report, if China and the world are to avoid the worst consequences of climate change, then China’s rapid growth in total carbon dioxide emissions— though approaching only the world’s average level on a per capita basis—must be curtailed and begin to decrease within the next two decades. This process must happen in parallel with deep emissions reductions by industrialized countries, starting now, in order to save the world from dangerous climate change. Based on what the world currently knows and is capable of achieving, CCS will likely be a necessary strategy, in concert with other measures, to realize critically needed emissions abatement in China and other large fossil fuel consuming countries. Because CCS involves largescale systems engineering and geologic expertise, international collaboration will be indispensable for accelerating CCS development and deployment in the countries that need the technology. For China, which still faces daunting development needs and has relatively limited technological, financial and regulatory capacities in some areas, international collaboration and assistance are all the more critical.

#### China is the largest emitter of CO2

Chen et al 10Chen, Qian, Peridas, Qiu, Ho: Natural Resources Defense Council, Friedmann: Lawrence Livermore National Laboratory, Li, Wei: Institute of Rock and Soil Mechanics, Chinese Academy of Sciences, Sung, Fowler: Clean Air Task Force, Seligsohn, Liu, Forbes: World Resources Institute, Zhang: China Tsinghua University, Zhao: Institute of Engineering Thermophysics, Chinese Academy of Sciences (Jason Chen, Jingjing Qian, George Peridas, Yueming Qiu, Bruce Ho, Julio Friedmann, Xiaochun Li, Ning Wei, S. Ming Sung, Mike Fowler, Deborah Seligsohn, Yue Liu, Sarah Forbes, Dongjie Zhang, Lifeng Zhao, December 2010, “Identifying Near-Term Opportunities For Carbon Capture and Sequestration (CCS) in China,” [http://docs.nrdc.org/international/files/int\_10121001a.pdf)//DR](http://docs.nrdc.org/international/files/int_10121001a.pdf%29//DR). H

After three decades of rapid industrialization fueled by coal, China is now the world’s biggest emitter of carbon dioxide (CO2)—the pollutant most responsible for global warming.1 This economic growth has lifted hundreds of millions of people out of poverty, and millions more could gain from further economic development. Yet continued reliance on coal-fired power threatens to create a climate catastrophe.

#### China key to solving emissions

Chen et al 10Chen, Qian, Peridas, Qiu, Ho: Natural Resources Defense Council, Friedmann: Lawrence Livermore National Laboratory, Li, Wei: Institute of Rock and Soil Mechanics, Chinese Academy of Sciences, Sung, Fowler: Clean Air Task Force, Seligsohn, Liu, Forbes: World Resources Institute, Zhang: China Tsinghua University, Zhao: Institute of Engineering Thermophysics, Chinese Academy of Sciences (Jason Chen, Jingjing Qian, George Peridas, Yueming Qiu, Bruce Ho, Julio Friedmann, Xiaochun Li, Ning Wei, S. Ming Sung, Mike Fowler, Deborah Seligsohn, Yue Liu, Sarah Forbes, Dongjie Zhang, Lifeng Zhao, December 2010, “Identifying Near-Term Opportunities For Carbon Capture and Sequestration (CCS) in China,” [http://docs.nrdc.org/international/files/int\_10121001a.pdf)//DR](http://docs.nrdc.org/international/files/int_10121001a.pdf%29//DR). H

Coal—the most carbon-laden of the three major fossil fuels (i.e., natural gas, crude oil, and coal)—supplies nearly 70 percent of China’s energy. China’s heavy reliance on this fuel is reflected by the fact that during the last five years the country has accounted for nearly fourfifths of the global growth in coal consumption.8 In 2008, China consumed more coal than North and South America, the European Union, Russia, the Middle East, and Africa combined (see Figure 2.1). Heavy reliance on coal has sharply driven up China’s CO2 emissions. In 1994, China emitted 3.07 billion tons, or gigatons (Gt), of CO2. A decade later, in 2004, China’s CO2 emissions stood 60 percent higher, at over 5 Gt a year.9 As a result, China’s annual CO2 emissions now exceed those of the United States.**10** With its CO2 emissions surging nearly eight times faster than in the rest of the world (see Figure 2.2), China has a pivotal role to play in the global effort to prevent the worst impacts of global warming from occurring.11

### AT: Soft Power – Leads to War

#### Soft Power causes war—needs to be balanced with hard power

**Hutson 10** DC Homeland Security (Mathew Hutson, July 22, 2010, “Soft Power Counterproductive without Hard Power Synergy,” [http://www.examiner.com/article/soft-power-counterproductive-without-hard-power-synergy)//DR](http://www.examiner.com/article/soft-power-counterproductive-without-hard-power-synergy%29//DR). H

The Obama Administration has referenced many times the need for the United States to dispense with the use of military force and initiate a new era of “soft power” in diplomacy. Of course any decent person wants peace, but what happens when you are confronted with a belligerent enemy? The fact remains soft power is useless without the legitimate threat of military superiority. The idea the United States provokes aggression with a strong military presence around the world is both absurd and dangerous.

The great conflicts of the first half of the 20th Century annihilated many and severely weakened the rest of the great powers. Standing on the ashes of the world in 1945 were the United States and the Soviet Union. The USSR seeing the USA a threat to its subjugated nations began proxy wars throughout the world with its current adversary. America, through its wealth and freedom, was a mortal threat because it showed a beacon to the rest of the world that societies could become stable and successful based on the twin virtues of order and liberty. This was “soft power,” but it was useless without facing down the bullets the communist world was shooting at its neighbors.

The Jihadist world sees the United States, and the world order it protects, in much the same light. Non-Muslims and even most Muslims reject Al-Qaeda’s vision of the world they wish to create. Osama bin Laden rejects the world that is currently created. Al-Qaeda flatly rejects any integration of democratic and Muslim society. The battle is for the Islamic world as a whole, not for just the hearts and minds of the citizens, but the levers of power to promulgate their view of society.

If there continues to be a vacuum of hard power from the United States, it will be filled across the World – from Korea to the Middle East to Latin America. When the United States will and capabilities come into question, foreign powers will calculate the risks of aggression and react. The result will be a self-fulfilled prophecy of major military conflicts.

### AT: Soft Power – Inevitable / No Impact

#### Soft Power is stupid and inevitable

Khanna 1/14Visiting fellow of LSE IDEAS, Senior fellow at the New America Foundation, Author of How to Run the World: Charting a Course to the Next Renaissance, Author of The Second World: Empires and Influence in the New Global Order (Parag Khanna, January 14, 2012, “The Persistent Myths of ‘Soft Power’,” [http://blogs.lse.ac.uk/ideas/2012/01/the-persistent-myths-of-soft-power/)//DR](http://blogs.lse.ac.uk/ideas/2012/01/the-persistent-myths-of-soft-power/%29//DR). H

Like ‘Clash of Civilizations,’ **the repetitive dissection of ‘soft power’ over time has only further muddied and corrupted whatever utility the phrase might once have had in its original formulation.** Both terms are provocative rejoinders to the spirit of the times, but **neither is analytically rigorous enough to improve policy.** If anything, **their endless hijacking has derailed serious policy discussions**, diluting them into sophomoric academic stand-offs.

Moving forward, **we need a far more neutral baseline in assessing power based not on a latent accounting of inputs such as nuclear stockpiles and Hollywood films produced, but on outputs: does it work? If the power you have is the wrong sort to get you what you want, then it is useless.** With this in mind, **Nye**’s Future of Power (2011) is a fine book but **adds little to the analysis of non-state influence on world affairs** beyond what Jessica Mathews accomplished in just one essay titled “Power Shift” published in Foreign Affairs in 1997. Numerous scholars have contributed far more substantially to the study of private authority and influence over conflict, negotiations, and outcomes.

As a student of diplomatic theory, **the greatest myth elevated by the notion of ‘soft power’ is its self-identification with diplomacy and their collective antithetical role to ‘hard’ or military power. No self-respecting diplomat with a modicum of historical knowledge would ever pretend that diplomacy should unilaterally disarm and operate absent coercive threats**. Indeed, **great diplomats** never use terms like ‘hard’ versus ‘soft’ power—they realize **that diplomacy is the task of marrying a range of instruments of leverage to get the job done.** The **Obama** administration **has continued to rely on military force in Afghanistan, has deployed it in Libya, uses it to tactically intimidate Iran, and is strategically reinforcing naval assets across the Pacific to reassure Asian allies** much as any Republican administration would.

**It remains then for Mitt Romney,** the likely Republican presidential nominee, **to distinguish his approach** in more depth than his platform slogan **of “peace through strength,”** and the claim in his recent book No Apology that **he will apply “the full spectrum of hard and soft power to influence events before they erupt into conflict.** Resort to force is always the least desirable and costliest option. **We must therefore employ all the tools of statecraft to shape the outcome of threatening situations before they demand military action.”** Thus far it sounds like Romney is challenging Obama for the Democratic Party’s nomination.

It might be interesting to interview—rather than listen to media stumps by—the would-be senior advisors to both the prospective Obama II and Republican administrations as to how they would tackle our many current diplomatic headaches such as Syria, Iran, the South China Sea and climate change, especially since so many of them are prone to using the hard/soft power jargon that obfuscates the search for real policy.

What is most curious about the persistent usage of ‘soft power’ in foreign policy and electoral discourse in America is that **the term hardly resonates in such a power conscious society that still believes in its exceptionalism.** For all its simplicity, it quite frankly goes over the head of most of the electorate who aren’t interested in academic debates. **No one wins elections by arguing that America should use ‘soft power’.**

**The last decade of think-tank studies on the nature of power have come up with little more than the coinage of ‘smart power’ as a vague amalgam of hard and soft forms.** Joseph Nye himself co-chaired a ‘Smart Power Commission’ whose banal conclusion was that the U.S. needs to increase spending on the State Department and shift from exporting fear to inspiring hope. As a noun, ‘**smart power’ is at best redundant to diplomacy, and thus superficial, irrelevant, and distracting.** At the New America Foundation’s “Smart Strategy Initiative,” ‘smart’ is used as an adjective. The program analyzes policy options, measure the costs, weigh the alternatives, and anticipate feedback loops. **Nobody disputes that America has vast power, nor that it needs strategy. Answering the how to deploy that power is much more about this kind of concrete process than about creating false dichotomies that only reinforce divisions we should have already overcome.**

### AT: Soft Power – No Impact

#### No positive impact

**Adelman 11** Former U.S. ambassador to the United Nations, Arms Control Director in the Reagan Ronald's administration (Ken, April 18, 2011, “Not-So-Smart Power,” [http://www.foreignpolicy.com/articles/2011/04/18/not\_so\_smart\_power)//DR](http://www.foreignpolicy.com/articles/2011/04/18/not_so_smart_power%29//DR). H

If there's indeed a war on soft power, allow me to fire another salvo. There's no question that important aspects of U.S. foreign policy -- **development aid, exchange programs, diplomacy -- are "soft." But are they a part of "power"? If not, are they all that "smart"?**

**Cutting the budgets of the State Department and U.S. Agency for International Development** (USAID) **does "serious damage to U.S. foreign policy" and can gravely "dent ... the United States' ability to positively influence events abroad," wrote Nye** in his article. "The result is a foreign policy that rests on a defense giant and a number of pygmy departments."

Sounds right, even profound. But **the deeper you consider it, the shallower it gets.**

Early in 1981, as a new U.S. ambassador to the United Nations, I launched a computer tabulation to show the correlation between others' receipt of U.S. foreign aid and their foreign- policy stances. I wanted to know: Did all that money buy America any love? The Neanderthal-era computer spewed its result: Nope.

**Huge recipients of U.S. foreign aid -- Egypt, Pakistan, and the like -- voted no more in tune with American values than similar countries that received no, or less, U.S. foreign aid.** Instead, **their votes correlated closely with those of Cuba**, which wasn't a big foreign-aid donor.

**That finding**, surprising at the time, **remains true. Four of the largest U.S. foreign-aid recipients today -- Egypt, Israel, Pakistan, and Afghanistan -- all take contrary positions on issues of critical importance to the White House. South Vietnam once got gobs** -- gobs upon gobs -- **of U.S. foreign aid**. **That didn't help much. Likewise with Egypt, Iran, Pakistan, Zaire** (now the "Democratic" Republic of the Congo), **and other "friendly"** (read: graciously willing to take U.S. money) **countries.**

The conclusion seems clear: **The relationship between "the United States' ability to positively influence events abroad," as Nye puts it, and the amount of U.S. foreign aid a country receives is unclear at best.** For decades now, **the United States has been the No. 1 foreign-aid donor** -- it has given the most money to poor countries -- **so it can't move up any on that scale. But this hasn't translated in making America the most popular or most influential country around the world. Quite the contrary.**

**Even the all-time No. 1 recipient of U.S. aid, Israel, rebuffs Washington constantly**, on momentous issues of peace. Moreover, **Israeli polls show the lowest approval for the U.S. president of nearly anywhere in the world.**

Hence **it's hard to see what a "dent" in "the United States' ability to positively influence events abroad" would look like if Republicans in Congress did slice these countries' foreign aid,** as Joe Nye dreads. It might look like, well, much like it does today. Put bluntly, **this aspect of soft power -- foreign aid**, by far the biggest in dollar terms, **amounting to some $30 billion\* a year -- may not constitute much power at all.**

The reason has to do with peculiar aspects of human nature. **Giving someone a gift generates initial gratitude** (often along with quiet gripes about why it wasn't bigger). **The second time, the gift generates less gratitude** (and more such griping). **By the third iteration, it has become an entitlement. The slightest decline engenders resentment, downing out any lingering gratitude.**

### AT: Soft Power – Alt Causes

#### Multiple actions are a prerequisite to effectively deploying Soft Power

**Lord and Cronin 10** Lordis vice president and director of studies at the Center for a New American Security and a former special adviser to the U.S. undersecretary of state for democracy and global affairs, Cronin is a senior adviser and senior director at the Center for a New American Security, Washington and a former assistant administrator for policy and program coordination at the U.S. Agency for International Development(Kristin, Parker, April 12, 2010, “Deploying Soft Power,” [http://www.defensenews.com/article/20100412/DEFFEAT05/4120314/Deploying-Soft-Power)//DR](http://www.defensenews.com/article/20100412/DEFFEAT05/4120314/Deploying-Soft-Power%29//DR). H

**Despite this unprecedented commitment to soft power, the U.S. government still lacks the ability to translate words into action. America remains strangely ill-equipped to combine hard power and soft power. The U.S. military filled this void over the last nine years while fighting two wars, but it is time to fix what is broken. Unless the U.S. government strengthens its diplomatic, informational and economic tools of power, this admirable new commitment to soft power will fail.**

**A key challenge is to integrate the elements of power consistently**, and not just in Washington strategy sessions but also **overseas**. We offer four steps forward:

**å We need to create a fund that supports surging our civilian work force into conflict zones**. Sen. John Kerry, D-Mass., chairman of the Senate Foreign Relations Committee, and Sen. Richard Lugar, R-Ind., the ranking minority member, have made clear **that a civilian surge is one of the prerequisites for success in Afghanistan.** Since Pentagon officials agree, it's time to put our money where our mouths are by using Defense Department money to create a fund for surging our civilian work force in stabilization missions and other complex contingencies.

å **We need to create civilian-led equivalents of military combatant commands that can unify our diplomatic, development, public engagement and defense efforts. The military has taken on new development and public diplomacy missions** because it has the ability to integrate these tools, the operational capacity to use them and a broad regional focus - but it is neither enthusiastic nor best-positioned to carry out these tasks.

Washington-based agencies focus on formulating and coordinating policy, not implementation. That step must occur in the field. This does not necessarily mean simply placing a civilian on top of an existing military command, such as U.S. Africa Command, where a civilian is a prominent deputy. It may mean creating regional or subregional hubs, regional equivalents of embassy country teams, that enable U.S. agencies to integrate diplomacy, development, public engagement and defense more effectively.

å **We need a new type of interagency professional**, expert in the tradecraft of one agency but **with vast networks across parochial governmental departments.** We envision a national security cadre in which defense, diplomacy and development agencies create career paths of experts skilled in managing complex global activities. Hybrid challenges require hybrid professionals. With expertise in interagency strategy, planning and implementation, this network of managers would create a vital capacity to combine soft and hard power effectively.

å **We need a larger civilian expeditionary force to respond to international crises when necessary**. The failure of the State Department and the U.S. Agency for International Development to send more than 1,000 civilians to Afghanistan in less than one year to support President Barack Obama's new strategy and a force growing to 100,000 troops illustrates the challenge.

The government's Civilian Response Corps has set a relatively meager goal of 250 active civilians who can deploy into stabilization and reconstruction missions. Unfortunately, this is insufficient for today's operational needs and tomorrow's possible contingencies. **Without a small but permanent civilian capacity, even the most brilliant strategy that integrates diplomacy, development and defense cannot bear fruit.**

**National security leaders should have no illusions that this will be easy.** A first step to wielding soft power well is to recognize not just its potential but also its limits**. Using soft power is hard. It relies on persuasion, negotiation, attraction and public engagement - the effects of which are rarely visible or swift.**

With coercion, change is quick, but **unintended consequences can linger**. For this reason, Mullen did something unpopular among many in uniform: He called for limited, restrained, precise uses of force. Victory demands looking past the immediate killing of enemies, which can engender deep wells of anti-Americanism.

Soft power is different. **Though the long-term effects can be pivotal, there is no instant gratification.** Since it is complicated to establish a cause, **it can be hard to know when soft power is working.**

### \*Reforestation Takeout – 1NC—Squo Solves

**Obama recently invested $1 billion in worldwide reforestation initiatives**

**US Department of State, et al. 10** (“U.S. REDD+ Programs: Addressing Climate Change by Conserving and Restoring the World’s Forests” U.S. Department of State, U.S. Agency for International Development, U.S. Department of Treasury, U.S. Department of Agriculture (including U.S. Forest Service), U.S. Environmental Protection Agency, NASA, U.S. Department of the Interior (including U.S. Geological Survey), December 2010, [http://kosovo.info.usaid.gov/our\_work/environment/climate/docs/UnitedStatesREDD+Brochure.pdf](http://kosovo.info.usaid.gov/our_work/environment/climate/docs/UnitedStatesREDD%2BBrochure.pdf)) MLR

As an important part of **President Obama**’s new Global Development Policy and the United States’ commitment to “fast start” financing in the Copenhagen Accord, we **are dedicating $1 billion** over the FY2010-2012 timeframe **to REDD+ plus activities that help countries to slow, halt, and eventually reverse deforestation**.1 **U.S. REDD+ fast start financing focuses on reducing emissions from deforestation and forest degradation, and enhancing sequestration by forests.** Other landscapes with high mitigation potential, such as peatlands and wetlands, may also be addressed. **REDD+ activities offer cost-effective opportunities to reduce global greenhouse gas emissions while providing other sustainable development benefits, such as improved local livelihoods, economic growth, and enhanced ecosystem services. The U**nited **S**tates **recognizes**, as does the United Nations Framework Convention on Climate Change, **that all nations should promote sustainable development and the realities of climate change require a sustainable, low emissions development path. This path offers opportunities for countries to improve** the **living standards** of their people **by ensuring sound economic growth while protecting the environment. As part of the Global Climate Change Initiative** (GCCI) under the Administration’s Global Development Policy, **the U**nited **S**tates seeks to mobilize financing from all sources, including the private sector, to leverage the respective strengths of multilateral and bilateral assistance mechanisms. We **will work to ensure that our climate finance is efficient, effective, and innovative, based on countryowned plans, and focused on achieving measurable results.** We will focus our bilateral efforts on those countries and regions where we have a comparative advantage, and will coordinate closely with other donors. The United States is taking a multipronged approach to the problem. **A variety of U.S. agencies are working to help countries get “ready” for REDD+ actions, including USAID** as well as **our technical agencies** which **are collaborating with developing countries to share the best of U.S. science, technology, and expertise through global, regional, and bilateral initiatives.**

**Reforestation solves emissions comparatively better than CCS**

**Zhao 9** – pursuing environmental science and chemistry degree at Franklin and Marshall College, organized the first International Youth Summit on Energy and Climate Change in Beijing (Yupu, “Will Forests Help Mitigate Climate Change? (part 1)” TH!NK: Climate Change, December 14 2009. <http://climatechange.thinkaboutit.eu/think4/post/will_forests_help_mitigate_climate_change_part_1/>) MLR

Beginning to realize the dire consequences of inaction, **many climate mitigation strategies have been proposed by scientists and politicians alike in recent years. Yet, many of these options, such as** mass deployment of renewable energies, or developing **carbon capture and storage** (CCS) that would inject CO2 directly into underground geological formation, **require huge investment in research and development** (R&D) **and are not likely to make significant impact on global carbon emissions** in the short term. **The IPCC** report **noted that preventing deforestation and better reforestation programs would be the mitigation option with the largest and most immediate carbon stock impact globally** (9). Consequently, **increasing attention has been given to policies that influence forestry and land-management practices**, both domestically and abroad. The on-going United Nations Framework Convention on Climate Change (UNFCCC) negotiations have focused on issues relating to reducing emissions from deforestation and forest degradation in developing countries (REDD). In the US, the American Clean Energy and Security Act (also known as the Waxman-Markey Bill), which was passed in the US House of Representatives in June, 2009, proposed a cap-and-trade system that would allow US corporations to offset their carbon emission through forestry and land-management activities. The prevailing bill in the Senate, proposed by Senator John Kerry and Barbara Boxer, also suggests a similar forestry carbon offset policy (8). **Why do forestry activities receive special attentions from experts of IPCC and other institutions?** This is because **forests play an essential role in the global carbon cycles**, in at least three ways. First, **forests are major contributors to the terrestrial carbon sink as they cover nearly 30% of the global land surface.** Annually, **terrestrial ecosystems remove approximately 3 billion tons of anthropogenic carbon through net growth, absorbing nearly 33% of all carbon dioxide emissions from fossil fuel burning and land-use change** (1, 2). Second, **forest ecosystems store large reservoirs of carbon.** According to the UN Food and Agriculture Organization’s report on global forest resources in 2005, **the total amount of carbon stored in forests is twice as much as it in the atmosphere** (3). Third, **not only are forests a major absorber and storehouse for carbon dioxide, they have been adding CO2 into the atmosphere as deforestation and forest degradation intensified throughout the world**, especially in the tropics. **The IPCC** 4th assessment report **estimated emissions from deforestation in the 1990s at a striking 5.8 Gt CO2/year** (9). According to the Union of Concerned Scientists data, **the tropic deforestation alone accounts for about 15 percent of greenhouse gas emissions** (6)!

### 2NC—REDD+

**The US recently dedicated $1 billion to reforestation efforts worldwide**

**USAID 10** (“Addressing Climate Change by Conserving and Restoring the World’s Forests: The United States Launches REDD+ Strategy” USAID, November 2 2010, <http://kosovo.info.usaid.gov/climate/redd/>) MLR

**The U.S. Government is proud to announce the release of the U**nited **S**tates’ **strategy to reduce emissions from deforestation and forest degradation and increase carbon sequestration by forests in developing countries. This is** commonly **referred to as REDD+. This U.S. government-wide strategy outlines how the U**nited **S**tates **will allocate and invest** the **$1 billion dedicated for REDD+ announced by** the **Obama** Administration **in** Copenhagen in **December 2009 at the meeting of the** United Nations Framework Convention on Climate Change (**UNFCCC**). The strategy was developed through an interagency process facilitated by the White House National Security Council (NSC) and the Council on Environmental Quality (CEQ). Two stakeholder meetings were held to collect information on private sector and civil society concerns and interests. **USAID participated actively throughout the process** and is proud of the significant contributions the Agency made to the strategy. **The strategy was created to guide budgetary decision making of the Administration and to guide programming design.** It delineates criteria that feed into decisions about which countries the United States supports with bilateral programs. Because **REDD+** assistance is a “whole of government” program, the strategy **will** help **ensure all U.S. government agencies work toward common objectives.** In addition, **the REDD+ strategy has been distributed to USAID field programs around the world to guide program design. It will** also **be useful in explaining U.S. government assistance priorities for climate change financing to USAID country counterparts and other partners.**

**REDD+ has international momentum—it’s key to combat climate change**

**Rowe 11** – post-graduate degree in journalism from City University (Mark, “REDD+ or dead?” Geographical Magazine, June 2011, <http://www.geographical.co.uk/Magazine/Dossiers/Forests_-_Jun_11.html>) MLR

Some rare **good news for the world’s beleaguered forests emerged** from the environmental conference in Cancun, Mexico, late last year. **Environment ministers** – some more willingly than others – **committed to pay developing countries to stop cutting down their rainforests.** At last, it seems, **a deal is in place to replenish our global stock of forests, protect biodiversity and recognise the work that forests do to bolster the planet against climate change** and support local indigenous people. After all, we can all surely agree that planting forests is a Good Thing. Optimists argue that **this is a firm step in the right direction in the battle against climate change**; there’s little dispute that **carbon emissions from forests that have been logged and cleared** – mainly for palm oil, pulp, cattle and soya – **need to be hauled in swiftly. Forests cover 30 per cent of our planet’s land area, and deforestation and forest degradation are major sources of greenhouse gas emissions. The** UN’s **I**ntergovernmental **P**anel on **C**limate **C**hange **has estimated that logging contributes to roughly 17 per cent of all greenhouse gas emissions,** which is more than transport and third only to the energy (26 per cent) and industrial (19 per cent) sectors. **The** Cancun **framework** agreement, **known as REDD+** (Reducing Emissions from Deforestation and Forest Degradation), **is a scheme under which developing countries would be paid not to cut down trees, and to replant and regenerate some that have already been felled. This includes reforestation, the re-establishment of forest on land where forest or plantations have been cut down** (and which brings about no change in forest area), **and afforestation, the planting of new trees where there were none before. All of this** goes beyond merely planting trees, however, and **aims to enhance carbon stocks, sustainable forest management and forest conservation. REDD+ is backed by the UN and the World Bank, and has secured agreements with 29 countries in Africa, the Asia-Pacific region and Latin America.** So far, **US$97million has been committed** – the major part of it, US$83million, from Norway – and at first glance, it reinforces the perception that the fortunes of the world’s rainforests, after decades of abuse, have taken a turn for the better.

**REDD+ is underway globally—it’s a key cost effective way to combat warming**

**Myers 11** – former captain of the sailing vessel Makulu II and led a 3-year educational expedition and global circumnavigation, currently specializes in the role of forests in mitigating climate change (Erin C., “Climate Change and Forestry: A REDD Primer” Ecosystem Marketplace, February 28 2011, <http://www.katoombagroup.org/documents/cds/uganda_2011/REDD/Climate%20Change%20and%20Forestry_%20A%20REDD%20Primer.pdf>) MLR

**Forests play an integral role in mitigating climate change. Not only are they one of the most important carbon sinks**, storing more carbon than both the atmosphere and the world's oil reserves, **they also constantly remove carbon from the atmosphere through photosynthesis**, which converts atmospheric carbon to organic matter. **But while forests are working diligently to clean up the carbon we have emitted** through burning fossil fuels, **deforestation is pumping carbon right back into the atmosphere.** The Drivers of Deforestation **Deforestation** in developing countries **is** frequently **driven by agriculture, logging, and road expansion.** Rising prices for soy, palm oil, and beef make it increasingly profitable for landowners in developing countries to clear forests and convert the land to agriculture. Often, burning is the cheapest and easiest way to clear the land. Contrary to popular belief, **when logging occurs**, only a fraction of the wood that is cleared ends up as dimensional lumber and eventually in housing and other structures. **The majority of the forest vegetation ends up as waste, and thus the majority of the carbon from the forest ends up in the atmosphere.** And **it's getting worse as policies that expand road infrastructure provide access for loggers, farmers and homesteaders to the previously inaccessible forest interior.** Deforestation Highest in Indonesia and Brazil Deforestation is not evenly distributed around the world. In fact, **Indonesia and Brazil account for 50% of the world's deforestation emissions. Because of these** deforestation **emissions, Indonesia and Brazil are ranked third and fourth among the top greenhouse gas** (GHG) **emitting countries**. If Indonesia and Brazil were able to abate their deforestation, their ranking would fall to 15th and eighth, respectively. The irony is that **we normally associate high GHG emissions with development and increasing GDP, but the activities that drive deforestation generally have low economic returns**. Thus, Indonesia and Brazil are among the top GHG emitters, but their emissions are from low-return activities. Low-Cost Emission Reductions Analyses examining the cost of REDD activities indicate that **abating deforestation is one of the most cost-effective ways to reduce emissions.** In their conservative calculations, **the** Intergovernmental Panel on Climate Change (**IPCC) estimates that** approximately **25% of deforestation emissions can be abated at a cost of less than $20 per metric ton of carbon dioxide** (tCO2). By comparison, the market price for carbon on the European Union Emissions Trading Scheme (EU ETS) was $35/tCO2 in the first quarter of 2008. It is important to note that the IPCC's cost estimates are based on the opportunity cost of probable land uses and don't include transaction costs such as monitoring, enforcement, and capacity building. 2/28/2011 Ecosystem Marketplace - Climate Chan… ecosystemmarketplace.com/…/article.… 1/5 The Role of REDD Given the magnitude of deforestation emissions and the low cost of abating those emissions, **REDD is poised to play a very important role in the global strategy to abate GHG emissions. "We cannot solve the climate problem if we do not include forests**," said Stuart Eizenstat in testimony before the House Select Committee on Energy Independence and Global Warming. A former Under Secretary of State in the Clinton Administration, Eizenstat now advocates the need to include market-based incentives for REDD activities in any future climate-change policy.

**US is pursuing REDD objectives across the globe in the status quo**

**US Department of State, et al. 10** (“U.S. REDD+ Programs: Addressing Climate Change by Conserving and Restoring the World’s Forests” U.S. Department of State, U.S. Agency for International Development, U.S. Department of Treasury, U.S. Department of Agriculture (including U.S. Forest Service), U.S. Environmental Protection Agency, NASA, U.S. Department of the Interior (including U.S. Geological Survey), December 2010, [http://kosovo.info.usaid.gov/our\_work/environment/climate/docs/UnitedStatesREDD+Brochure.pdf](http://kosovo.info.usaid.gov/our_work/environment/climate/docs/UnitedStatesREDD%2BBrochure.pdf)) MLR

The strategy lays out the U.S. long-term objectives for REDD+ investments. By **working** together **with the international community, the U**nited **S**tates **expects to make significant progress** through its contribution during this initial three year period. **Objective 1:** REDD+ Architecture: **Creating and supporting an efficient, effective, and coordinated international system to help countries deliver REDD+ outcomes.** Focus of architecture investments: **The U**nited **S**tates **will support** the creation of **a framework that drives policies and programs with evidence of impact by generating, evaluating, and analyzing outcomes and providing coordinated, transparent, and effective financing and technical support to developing countries. The U**nited **S**tates **will target investments to support a coherent global approach to REDD+. This** REDD+ “architecture” **includes well-functioning multilateral funds, enhanced donor coordination, application of effective methodologies and technologies, shared best practices, and cost-efficient access to data.** The architecture should also ensure transparency of mitigation actions and forest carbon data, effective application of safeguards, and provision and effective use of financing. The United States will support the following types of activities under this objective: Participation in selected multilateral REDD+ funds, and other international REDD+ related processes, to advance the coherence and coordination of REDD+ efforts, while seeking to ensure that multilateral efforts are consistent with U.S. policies and approaches. • Assessment of modalities for measuring REDD+ GHG mitigation, dissemination of best practices, sharing of data, and access to tools for decision making, including through applied research, training, publications, and regional and global platforms. • Regional and global approaches to capacity building for national GHG land use inventories, consistent with the Intergovernmental Panel on Climate Change (IPCC) methodologies and guidance. • Strategic coordination with other donors and multilateral efforts, aimed at forging a deliberate “division of labor,” harmonizing our approaches, increasing efficiencies and ensuring that our efforts are transparent, focused squarely on sustainable outcomes, and informed by data and evidence. • Responding to the ongoing UNFCCC negotiations on environmental and social safeguards and on approaches to making REDD+ emissions reductions and removals measurable, reportable, and verifiable (MRV), by helping to implement those global framework decisions as they are agreed. **Objective 2**: REDD+ Readiness: Hel**ping countries become ready to participate in pay-for-performance programs and take complementary domestic actions. Investments will help countries become ready** at the national level **to undertake actions at a scale that can significantly reduce emissions or increase sequestration, enable access to pay-for-performance financing, including future carbon markets, and meet ambitious domestic mitigation commitments.** Sustained progress requires that developing countries build the capacity to design, manage and implement their own REDD+ plans and incorporate low emissions strategies into their broader economic growth and development plans. **This objective** therefore **supports country readiness for both domestic actions and pay-for-performance opportunities**, in the context of ambitious national REDD+ plans. Actions under this REDD+ readiness objective will help build the capacity of our partners in the developing world and support the creation and implementation of national policies for REDD+. **This includes** creating **incentives for local forest mitigation results and facilitating access to a wide range of public and** 5 **private-sector financing**, from both domestic and international sources. **U.S. investments will include** the following types of activities: Support for host countries’ development of REDD+ strategies, i • n particular those being developed as part of an economy-wide low emissions development strategy (LEDS). • Support for REDD+ readiness activities at the local government level. This includes assistance with sub-national REDD+ strategies, benefit sharing and safeguard systems, emissions inventories, and land use planning and monitoring. • **Support fo**r development of robust **national greenhouse gas inventories**. • **Support for the development of national forest carbon inventories**, and the piloting of reference scenarios, within the framework of national greenhouse gas inventories. • **Promotion of national standards and systems for effective environmental and social safeguards for REDD+ activities.** • Provision of technical assistance on national legal, regulatory, and financial structures necessary for enabling private sector finance for low emissions development and participation in any future carbon market; for example, to manage benefit-sharing from results-based payments. Implementation of readiness elements within a country’s national REDD+ strategy, if a strategy exists. This might include strengthening the aspects of national forest governance, national technical management capacity, and national land and tree tenure policies that are directly necessary to achieve emissions reductions and sequestration at scale. Support to help countries design and carry-out national level policy reforms that are part of low emissions development strategies and change economic incentives toward reduced net emissions. Examples include policies for payments for ecosystem services, changes to subsidies and tariffs to facilitate decreased net emissions from land use, national land use and land planning especially related to reducing agricultural pressures on forests, and forest management reforms, including improved forest governance. **Objective 3**: REDD+ Demonstration: **Achieving cost-effective and sustainable net emissions reductions. Investments will support programs that achieve**, or that demonstrate scalable approaches to achieving significant**, cost-effective net emissions reductions**.

**International consensus exists that REDD+ is key to solve emissions through reforestation and conservation**

**Virgilio, Marshall, Zerbock, and Holmes 10** – Forest Carbon Specialist, Forest Carbon Development Team - Global Climate Change Team; Managing Director for The Nature Conservancy's Global Climate Change Team; Advisor, Climate Change Initiatives; Wildlife Conservation Society (Nicole, Sarene, Olaf, and Christopher, “Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience.”The Nature Conservancy, Conservation International and Wildlife Conservation Society. 2010. <http://www.hedon.info/docs/REDD_Casebook-TNC-CI-WCS.pdf>) MLR

**Forests have a critical role to play in addressing climate change.** About **15 percent**1 **of annual global carbon dioxide emissions are caused by deforestation and forest degradation** (van der Werf, et al., 2009; Canadell, et al., 2007) and **it will be extremely difficult to solve the climate change problem without reducing these emissions**.2 **Recognizing the importance of and providing incentives for conserving (as well as restoring and better managing) forests provides an effective way to mitigate climate change while offering a cost-effective and near-term option to ease the transition to low carbon economies** (Stern, 2006; Eliasch, 2008). **Within the current policy context, there is interest in including the full scope of forest carbon activities in an overall REDD framework— Reducing Emissions from Deforestation and Forest Degradation**, Forest Conservation, Sustainable Management of Forests and Carbon Stock Enhancement3—dubbed REDD Plus**.** Despite this potential**,** nearly allregulatory climate policy frameworks and markets still fail to include Reducing Emissions from Deforestation and Degradation (REDD) as a tool for climate change mitigation**.** The failure to include REDD within regulatory frameworks is a legacy of previous concerns regarding the additional, verifiable and permanent climate benefits of REDD activities. Ongoing work to resolve these concerns should help policy makers incorporate robust REDD strategies into climate change plans at the local, national and international level. Although no legally binding agreement was reached **at the December 2009 U**nited **N**ations **climate conference** in Copenhagen, **REDD Plus was one of the areas where there was strong agreement in** both **the importance of addressing emissions from deforestation and degradation** and the need for creation of an international REDD Plus framework.

**REDD+ efforts are gaining international traction**

**Virgilio, Marshall, Zerbock, and Holmes 10** – Forest Carbon Specialist, Forest Carbon Development Team - Global Climate Change Team; Managing Director for The Nature Conservancy's Global Climate Change Team; Advisor, Climate Change Initiatives; Wildlife Conservation Society (Nicole, Sarene, Olaf, and Christopher, “Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience.”The Nature Conservancy, Conservation International and Wildlife Conservation Society. 2010. <http://www.hedon.info/docs/REDD_Casebook-TNC-CI-WCS.pdf>) MLR

Lessons for moving to national scale **While project-scale REDD initiatives**, as most of the efforts profiled in this report are, **can produce credible carbon benefits, there is an emerging interest, especially in climate policy dialogues, in moving to national REDD Plus schemes.** Lessons learned and methodologies developed from earlier on-theground pilot efforts, such as those detailed in this report, among others, can help inform these larger scale efforts. **The interest in national-scale efforts is** in part **because of the magnitude of the positive climate impact that such nation-wide programs could have**, but also because of the advantages of such large-scale efforts in engaging governments and dealing with certain technical challenges across whole countries. **Establishing national carbon accounting**, for example, **would** likely **enable simpler and more cost-effective methods for dealing with baselines than at the project scale** (which generally relies on complex modeling), while capturing any potential intra-country leakage. Similarly, **efforts that are broader in scope**, such as REDD Plus—which could include Reducing Emissions from Deforestation and Forest Degradation, Forest Conservation, Sustainable Management of Forests and Carbon Stock Enhancement—**are gaining traction, not only for their potential to result in more carbon benefits, but their ability to ensure the sustainability of carbon benefits by maintaining production and access to resources for local communities**. REDD Plus was included in the Copenhagen Accord, which came out of the United Nations Framework Convention on Climate Change (UNFCCC) COP-15 held in December 2009, and many governments, including the United States, provided significant financial support to expand the scope of REDD to the abovementioned activities.

### 2NC—Squo Solves

**Forest density is increasing now – that solves warming**

**The Independent 11** (June 5, “Forests fight back all over the world; Woodland density is going up after decades of decline, but concerns about deforestation remain. Andrew Marszal reports on the Great Reversal” Lexis//CR)

Forest density is increasing across much of the world after decades of decline, according to a new study by scientists from the United States and Europe. The change, which is being dubbed the Great Reversal by the authors, has important, has positive implications for carbon capture and climate change. The research, carried out by teams from the University of Helsinki and New York's Rockefeller University, shows that forests are thickening in 45 of 68 countries, which together account for 72 per cent of global forests. Traditionally, environmentalists have focused their concern solely on the dwindling extent of forested areas, but the authors believe new evidence of more dense forest - made up of more and larger trees - could be **crucial** in reducing atmospheric carbon, which is linked to climate change. Forests are often referred to as the planet's lungs, acting as huge carbon sinks that absorb carbon dioxide from the atmosphere as they grow and trap large amounts within their biomass and surrounding soil. In countries from Finland to Malaysia, the thickening has taken place so quickly that it has reversed the carbon losses caused by forested areas continuing to shrink during the period studied (1990-2010). In other places, including the Brazilian rainforest and parts of Africa, increasing density has partially offset the toll of deforestation caused by logging and other human activities. With the Great Reversal, the study's authors believe a tipping point has been reached, with countries now able to pursue policies to boost their forests' thickness and carbon capacities dramatically. Jesse Ausubel, a director at the Rockefeller University and a co-author, said: "The enlarging forests in almost 50 nations studied may signal the start of a welcome and necessary restoration." Aapo Rautiainen, lead author of the report, and based at Helsinki University, said: "The reversal occurred in Europe much earlier, then a little bit later in North America, and it has now spread to certain parts of Asia. So that is a positive sign." He hopes policy-makers will take note: "The carbon-storage question is important as there is growing political interest in using forests as a part of climate mitigation policy.... There is a wide range of different ways you can manage forests - density is a decisive factor in carbon storage in addition to area." Professor Pekka Kauppi of Helsinki University, a co-author of the study, said: "People worry about forest area, and that's quite correct. But if you want to know the carbon budget, it cannot be monitored observing only the changes in area. It is more important to observe this change in forest density." Commenting on the study, Mette Loyche Wilkie, co-ordinator of the UN's Global Forest Resources Assessment 2010 report, confirmed that in some countries "the growing stock per hectare is increasing - and so is the carbon sequestered". She noted that a recent UN report observed this trend occurring "globally". She added that the change was uneven, and most notable in Europe, where forests had grown in density by over 6 per cent in the past decade, and North America. Environmentalists expressed concerns, however, that much of the increasing density is driven by huge new monoculture plantations. For example, China's ambitious reforestation programme has added three million new hectares (nearly eight million acres) to the country's forests every year over the past decade, but green campaigners believe this is predominantly composed of one species - eucalyptus. Planted forests are certainly playing a major role. Every year, more than 10 million hectares of forest are planted worldwide, either on newly felled woodland or reclaimed land. Species that grow faster and taller are often preferred, even where this entails importing new species, with the effects on density not seen until these reach "middle age". Bustar Maitar, who works on Greenpeace's rainforest campaign in Indonesia, expressed concerns over the loss of biodiversity, saying: "There is a carbon capture, but it's mostly the timber plantations. Timber plantations are ecologically quite different from the forest. The solution is to stop cutting down natural forests." Though the study, entitled A National and International Analysis of Changing Forest Density, does not itself consider biodiversity, the authors concede there is a balance to be struck. "Almost always there are trade-offs. Harmonising with other goals for forests is always difficult," says Professor Kauppi. "They have to serve many purposes - whether it's beauty, like the English countryside where the important priority is the landscape, or biodiversity, or protection, there are many things. It always has to be balanced, but the carbon budget is important." The report's lead author, Mr Rautiainen, added: "In some regions, of course, the emphasis on monoculture plantations is very important, but there are also possibilities of managing semi-natural or natural forests. You can't directly infer worsening or improving biodiversity from forest density." While for much of the world thickening forests are a new phenomenon, in Europe this has been occurring since the Second World War. According to a German study in the Forest Policy and Economics journal in 2006, forest density has almost doubled in Western Europe over that time, primarily because of modern, intensive forest management, and the spectacular growth of major plantations. In the rest of the world, where the thickening trend is only now emerging, the increase is slower, currently at around 1 per cent each decade in South America and parts of Asia and Africa. However, in a country the size of Brazil, which has more than 500 million hectares of already dense forest, **even a small shift** means **millions** of additional tons of carbon are trapped in the remaining rainforest.

**USAID partners with countries and corporations to ensure sustainable forests**

**USAID 8** (“International Deforestation and Climate Change: Statement for the record by US Assistant Administrator for Economic Growth, Agriculture and Trade” USAID Press Release, March 23 2008 <http://www.illegal-logging.info/item_single.php?it_id=2657&it=news>) MLR

**USAID works in partnership with recipient countries, NGOs, and other partners on many fronts. The goal is to first empower local communities**. Local populations are the most immediate custodians in the management of tropical forests, and USAID recognizes that engaging these users is critical to sustainably managing and protecting those forests. **Second, we aim to improve forest policy. We work with host country governments to establish favorable forest management laws and policies, ensure transparency and stakeholder participation, and build capacity to implement those policies. Third we promote sustainable practices. We help establish sustainable forest management practices in forest enterprises. Fourth, we** coordinate efforts across borders. Important tropical forests often cross political boundaries; we **support programs that work across borders to promote effective large-scale forest conservation**. And finally, **we make it a priority to involve the private sector. Through public private partnerships, USAID successfully leverages private sector financing and commitments to facilitate** legal and transparent **trade of forest products derived from legitimate operators and well managed forests.** By forging partnerships that function at local, national, and international levels**, the US Government is implementing a wide range of effective initiatives and programs that reduce deforestation and associated greenhouse gas emissions while also supporting sustainable development goals.** I would like to highlight for the Committee some of the key U.S. efforts in this area. As reported in our most recent performance report, **USAID supports sustainable forest management and conservation around the globe, investing approximately $85 million in tropical forest activities** from all funding accounts **in** FY **2006**1. **These investments led to significant accomplishments in Africa, Asia, the Near East, Latin America and the Caribbean.** In addition, the Tropical Forest Conservation Act program receives an annual budget of $20 million per year allocated to the Debt Restructuring Account (DR) in Treasury in which USAID plays a key management role. In 2006, $27 million from this account leveraged $42.7 million for forest conservation through local NGOs and community groups.

### 2NC—Reforestation Solves

**Reforestation solves warming**

**Daniels 10** (Brian, January 7, “The Benefits of Supporting Global Reforestation”, http://suite101.com/article/the-benefits-of-supporting-global-reforestation-a186685)

As more people become concerned about protecting the environment, many are looking into the potential ways they can contribute to the global environmentalist movement. Among the programs that eco-friendly citizens should consider supporting are global reforestation projects. The positive impact of reforestation is substantial, providing a host of benefits to the chemical, biological, and social dimensions of the global ecosphere. Reforestation is an Effective Green House Gas/Carbon Sequestration Strategy One of the most prominent dangers of global deforestation is the accumulation of carbon-based greenhouse gases such as methane and carbon dioxide in the atmosphere, gases which have the potential to contribute to global climate change. Trees thrive on carbon gases, using carbon molecules to produce everything from sugar during photosynthesis to cellulose and wood as they grow. Planting trees, particularly young ones, effectively sequesters substantial amounts of atmospheric carbon, because, as trees grow, they transform carbon in the air into biomass (wood, foliage, glucose, etc.). Because of this, reforestation is a **very effective** strategy for decreasing the amount of carbon gas in the atmosphere, an **important step** in the fight against global climate change. Reforestation Preserves Endangered Wildlife and Shrinking Habitats Forest trees serve as habitat space for many thousands of species which use them for food, shade, and shelter. Particularly in the Amazonian rain forest, deforestation threatens the existence of many of Earth’s most spectacular plant and animal species. Reforestation projects which use indigenous tree species preserve natural habitat space for native insects, mammals, birds, and more. Replanting native forests also ensures forest corridor space which allows forest animals to move freely between sections of mature forest. This prevents animals from being trapped in dangerous or resource-depleted areas, allowing them to survive even in the midst of regional deforestation or habitat loss. Reforestation Alleviates World Hunger and Water Availability Issues Many indigenous peoples are dependent on local, native trees for sustenance, relying on fruits, nuts, and forest animal species as a primary source of food. Because of this, deforestation threatens the livelihood of villagers in many parts of the world. Reforestation, then, alleviates the loss of food resources among native forest peoples. Likewise, planting of fruit/nut bearing trees in other parts of the world afflicted by famine and food shortages provides a nutritious, renewable source of food for hungry people. Trees also help sustain food resources by protecting against erosion, thereby preserving soil quality for agriculture. In arid regions and areas experiencing drought, planting trees also has the potential to raise the water table, providing much needed water for those living in dry areas. Likewise, trees preserve soil moisture and moderate regional temperatures, preventing the spread of deserts. Ultimately, there are many compelling reasons to support reforestation projects for those looking to contribute to an environmental cause. The world’s forests are among its most important resources, and protecting them will go a **long way** towards fighting global climate change, protecting endangered species and their habitats, and addressing world hunger/ water availability issues. References and Additional Reforestation Resources One can find more detailed information about the benefits of reforestation via Plant-It 2020, a nonprofit environmental organization dedicated to reforestation projects and environmental education. More information and other reforestation projects can also be found via American Forests’ Global ReLeaf program.

**Reforestation is key to slash emissions—photosynthesis absorbs CO2 and prevents it from returning to the atmosphere**

**Virgilio, et al. 10** – Forest Carbon Specialist, Forest Carbon Development Team – Marshall, Global Climate Change Team; Zerbock, Managing Director for The Nature Conservancy's Global Climate Change Team; Advisor, Climate Change Initiatives; Holmes, Wildlife Conservation Society (Nicole, Sarene, Olaf, and Christopher, “Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience.”The Nature Conservancy, Conservation International and Wildlife Conservation Society. 2010. <http://www.hedon.info/docs/REDD_Casebook-TNC-CI-WCS.pdf>) MLR

The Role Of Forests In The Carbon Cycle **Trees absorb carbon dioxide gas from the atmosphere during photosynthesis and, in the process of growing, transform the gas into the solid carbon that makes up their bark, wood, leaves and roots. When trees are cut down** and burned or left to decompose, **the solid carbon chemically changes back to carbon dioxide gas and returns to the atmosphere. Even if the trees are harvested, only a fraction of harvested trees makes it into long-term wood products** such as houses and furniture. For example, one study estimates that **for every tree harvested using conventional logging techniques** in Amazonia, **35.8 additional trees were damaged** (Gerwing, et al., 1996). As much as 20 percent of usable timber volume that was extracted from a typical hectare was never removed and instead left to rot in the forest. Furthermore, less than 35 percent of the timber that made it to the sawmill was actually converted into usable boards. Hence, **the majority of the harvested forest vegetation ends up as waste and, whether burned or left to decay, emits carbon dioxide gas as it breaks down** (see Figure 5). **Forests and other terrestrial systems annually absorb approximately 9.53 gigatons of carbon dioxide** equivalent (GtCO2e),7 **while deforestation and degradation of forests emit approximately 5.87 GtCO2e, for net absorption of 3.67 GtCO2e** (IPCC, 2007a). **Forests** therefore **play an important role in the global carbon cycle as both a “sink” (absorbing carbon dioxide) and a “source” (emitting carbon dioxide)**. According to the most recent Intergovernmental Panel on Climate Change (IPCC) report, the 5.87 GtCO2e emitted by deforestation and degradation of forests accounts for 17.4 percent of total emissions from all sectors, more than the emissions of the entire global transportation sector (see Figure 6) (IPCC, 2007b). More recent estimates put this percentage at about 15 percent, due mainly to increases in fossil fuel emissions and the use of updated data (van der Werf, et al., 2009; Canadell, et al., 2007). **Policy and economic incentives to curb deforestation and forest damage have the potential to enhance the natural functioning of the world’s forests in sequestering, or storing, carbon and to reduce their role as a significant source of emissions.**

**Reforestation is key to avert runaway warming**

**USAID 8** (“International Deforestation and Climate Change: Statement for the record by US Assistant Administrator for Economic Growth, Agriculture and Trade” USAID Press Release, March 23 2008 <http://www.illegal-logging.info/item_single.php?it_id=2657&it=news>) MLR

Tropical forests are critical to the survival and well-being of people around the world. For example, many people depend on forests for food, shelter, income, medicine, and clean water. In addition, tropical forests harbor some of the world's unique and critically endangered biodiversity, for example at least 120 important drugs currently in use were originally derived from naturally occurring plant species. **Forests** help **mitigate climate change by storing carbon in vegetation and soils.** Forests also provide other services, such as regulating water quality and quantity by slowing the runoff of rainwater, improving infiltration of water into soils, and filtering water as it flows to streams and aquifers. This helps provide safe and reliable water sources to surrounding communities. **Healthy forests enable surrounding communities to be resilient to economic and environmental shocks** such as drought. Forests and biodiversity are also important to many people for their spiritual and aesthetic values. Unfortunately, **tropical forests face** a number of **threats, including conversion to agriculture, illegal logging, unsustainable extraction of timber and other forest resources, climate change, pollution, and policies that subsidize forest conversion to other uses. Deforestation is a significant contributor to climate change**: **Scientific studies have estimated that 20% of global greenhouse gas emissions are attributable to deforestation. Each year, approximately 10.4 million hectares of forest are lost.** To put this into perspective, that is equivalent to losing an area roughly the size of Virginia each year. The World Bank estimates that illegal logging represents a loss of $10-15 billion per year to developing countries. Illegal logging also fuels corruption and in some countries finances conflict. **Loss of forest cover, riparian buffers and mangroves** also **represent a significant increase in** regional and local **vulnerability to climate variability and climate change.**

**Reforestation solves the economy, food scarcity, and warming**

**USAID 8** (“International Deforestation and Climate Change: Statement for the record by US Assistant Administrator for Economic Growth, Agriculture and Trade” USAID Press Release, March 23 2008 <http://www.illegal-logging.info/item_single.php?it_id=2657&it=news>) MLR

**Activities in the forest sector** address forests and climate change strategically. Our programs work to **reduce CO2 emissions from deforestation, promoting sustainable forest management and forest conservation, and increase CO2 sequestration through reforestation.** Activities seek the significant co-benefits of economic development and improved livelihoods that come from local economies that are diversified through productive integration of trees in agricultural lands, and sustainable use of existing forests. **Reforestation is a way to accomplish economic development, increase food security, meet energy needs, provide** environmental services like **improved water supply, and reduce sources of conflict.**

**Reforestation is successful and cost-competitive**

**Claussen 5** – President, Pew Center on Global Climate Change (Eileen, “Forward: The cost of U.S. forest-based carbon sequestration” Pew Center on Global Climate Change, January 2005 <http://www.pewclimate.org/docUploads/Sequest_Final.pdf>) MLR

**Most** analyses to date of **options for mitigating the risk of global climate change have focused on reducing emissions of carbon dioxide and other greenhouse gases** (GHGs). Much **less attention has been given to the potential for storing** (or “sequestering”) **significant amounts of carbon in forests** and other ecosystems **as an** alternative **means of offsetting the effect of future emissions on GHG concentrations in the atmosphere. The tendency to overlook sequestration** opportunities **can lead to incorrect and overly pessimistic conclusions about** both **the cost and feasibility of addressing global climate change in the decades ahead.** To remedy that gap, and to inform U.S. policymaking, the Pew Center asked **economists Robert Stavins of Harvard University and Kenneth Richards of Indiana University** to **synthesize and expand upon available studies of forest-based carbon sequestration in the U**nited **S**tates. They analyze the true opportunity costs of using land for sequestration, in contrast with other productive uses, and examine the multiple factors that drive the economics of storing carbon in forests over long periods of time. These factors include forest management practices for different tree species and geographical regions; the costs of land and competing prices for agricultural products; the ultimate disposition of forest materials, including the potential for fire damage as well as harvesting for use in different kinds of end products; the specific carbon management policy employed; and the effect of key analytical parameters, including in particular the discount rate applied to future costs and benefits. The authors then adjust the findings from major recent studies of forest sequestration to reflect consistent assumptions in each of these areas and use the normalized results to establish a likely range for the overall scope and likely costs of large-scale carbon sequestration in the United States. **Their conclusions are striking. Estimated costs for sequestering up to 500 million tons of carbon per year—an amount that would offset up to one-third of current annual U.S. carbon emissions—range from $30 to $90 per ton.** On a per-ton basis, **these costs are comparable to those estimated for other climate change mitigation options such as fuel switching or energy efficiency. A** sequestration program on this scale would involve large expanses of land and significant upfront investment; as such, it would almost certainly require a phased approach over a number of years and careful attention to policy details to ensure efficient implementation. Nevertheless, the results of this study indicate that **sequestration can play an important role in future mitigation efforts and must be included in comprehensive assessments of policy responses to the problem of global climate change.**

**Forests solve warming—they sequester CO2 from the atmosphere**

**Claussen 5** – President, Pew Center on Global Climate Change (Eileen, “Forward: The cost of U.S. forest-based carbon sequestration” Pew Center on Global Climate Change, January 2005 <http://www.pewclimate.org/docUploads/Sequest_Final.pdf>) MLR

**Human activities**—particularly the extraction and burning of fossil fuels and the depletion of forests—**are causing the level of GHGs (primarily CO2) in the atmosphere to rise. The primary sources of the** slow but steady **increase in atmospheric carbon are fossil fuel combustion**, which contributes approximately 5.5 gigatons (billion metric tons) of carbon per year, **and land-use changes**, which account for another 1.1 gigatons. In contrast, the oceans absorb from the atmosphere approximately 2 more gigatons of carbon than they release, and the earth’s ecosystems appear to be accumulating another 1.2 gigatons annually. In all, **the atmosphere is annually absorbing approximately 3.4 gigatons of carbon more than it is releasing.** While the annual net increase in atmospheric carbon may not sound large compared with the total amount of carbon stored in the atmosphere—750 gigatons—it adds up over time. For example, if **the current rate of carbon accumulation were to remain constant, there would be a net gain in atmospheric carbon of 25 percent over the next fifty years.** In fact, **the rate at which human activity contributes to increases in atmospheric carbon is accelerating.** Emissions from land-use change have been growing at the global level, though not nearly as rapidly as emissions from fossil fuel combustion. In the United States, land-use change—which was a substantial source of carbon emissions in the 19th and early 20th centuries—became a sink (or absorber of carbon) by the second half of the 20th century. However, the rate of carbon absorption by terrestrial systems in the United States peaked around 1960 and has been falling since. **It may be possible to increase the rate at which ecosystems remove CO2 from the atmosphere and store the carbon in plant material, decomposing detritus, and organic soil.** In essence, **forests and other** highly **productive ecosystems can become biological scrubbers by removing (sequestering) CO2 from the atmosphere.** Much of the current interest in carbon sequestration has been prompted by suggestions that **sufficient lands are available to use sequestration for mitigating significant shares of annual CO2 emissions**, and related claims that **this approach provides a relatively inexpensive means of addressing climate change.** In other words, the fact that **policy makers are giving serious attention to carbon sequestration** can partly be explained by (implicit) assertions about its marginal cost, or (in economists’ parlance) its supply function, relative to other mitigation options.

**Reforestation key to climate cooling—most recent science proves**

**RedOrbit 11 — citing research from Carnegie Mellon’s Julia Pongratz and Ken Caldiera** (“Reforestation’s Cooling Influence — A Result Of Farmer’s Past Choices” July 26 2011, <http://www.redorbit.com/news/science/2085481/reforestations_cooling_influence__a_result_of_farmers_past_choices/>) MLR

**Previous studies that have attempted to understand the balance between cooling and warming from regrowing a forest considered unrealistic and highly idealized scenarios.** The study by **Pongratz and colleagues for the first time evaluated the climate cooling potential of reforestation taking historical patterns of land-use conversion into consideration.** Pongratz and colleagues found that **farmers generally chose to use land that was more productive than average, and therefore richer in carbon**. Furthermore, **farmers** generally **chose to use land that was less snowy than average.** While this result is not in itself surprising, **its implications for the cooling potential of reforestation previously had been ignored. Regrowing forest on these productive lands can take up a lot of the greenhouse gas carbon dioxide, and therefore have a strong cooling influence. Because these lands are not very snowy, regrowing forests would not absorb very much additional sunlight. The net effect** of the historical preference for productive snow-free land **was to increase the climate cooling potential for reforestation on this land.** "Taking historical factors into account, we believe that we have shown that **reforestation has more climate cooling potential than previously recognized**," Pongratz said. "We are still not yet at the point where we can say whether any particular proposed reforestation project would have an overall cooling or warming influence. Nevertheless, **broad trends are** becoming **apparent**. The cooling effect of reforestation is enhanced because farmers in the past chose to use productive lands that are largely snow free."

**REDD projects have verifiable emissions reduction benefits**

**Virgilio, et al. 10** – Forest Carbon Specialist, Forest Carbon Development Team – Marshall, Global Climate Change Team; Zerbock, Managing Director for The Nature Conservancy's Global Climate Change Team; Advisor, Climate Change Initiatives; Holmes, Wildlife Conservation Society (Nicole, Sarene, Olaf, and Christopher, “Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience.”The Nature Conservancy, Conservation International and Wildlife Conservation Society. 2010. <http://www.hedon.info/docs/REDD_Casebook-TNC-CI-WCS.pdf>) MLR

**Credible carbon benefits can be achieved** Third-party verification of carbon offsets to stringent standards developed for REDD demonstrates that **emissions reductions from REDD projects can be real, measurable and verifiable. Project assumptions, methodologies and calculations are subject to** a **transparent and rigorous independent inspection.** All projects profiled in this report plan to undergo third-party verification to an established standard, with the exception of Noel Kempff, which was developed prior to the existence of modern REDD standards and has already been verified to a standard based on the Clean Development Mechanism’s Afforestation/Reforestation guidance. In fact, **in** the first half of **2009 it was determined that 96 percent of all forest carbon projects on the voluntary market were verifying to third-party standards** (Hamilton, et al., 2010). **Other standards which target social and environmental co-benefits, in addition to climate benefits, are in existence and being used more frequently as a complement to carbon standards, helping to ensure that** human rights are respected and **environmental integrity remains high.**

**Solves warming** **faster than the aff**

**EPA 12** (United States Environmental Protection Agency, OSRTI Abandoned Minelands Team, “Carbon Sequestration through Reforestation A LOCAL SOLUTION WITH GLOBAL IMPLICATIONS ”, March 2012,[www.epa.gov/aml/revital/cseqfact.pdf](http://www.epa.gov/aml/revital/cseqfact.pdf%22%20%5Ct%20%22_blank)) KH

**Before the Industrial Revolution**, the concentration of **greenhouse gases** (GHGs) **in the atmosphere remained** relatively **constant**. Except for slow changes on a geological time scale, **the absorption and release of carbon was kept in balance.** During that time, **changes in biomass and soil organic carbon were the main sources of fluctuation in atmospheric levels of carbon. By clearing forests and burning fossil fuels more rapidly than the carbon can be sequestered, industrialization may have altered this equilibrium**.Currently, **human activity is directly or indirectly responsible for the release of six to seven billion metric tons of carbon annually**. Since before the Industrial Revolution, CO2 concentrations in the atmosphere have increased from 280 parts per million (ppm) to nearly 380 ppm in 2005. CO2 emissions from energy use are projected to increase between 40 to 110 percent between 2000 and 2030. Increases in atmospheric CO2 concentration may be generating increases in average global temperature and other climate change impacts. Although some of the effects of increased CO2 levels on the global climate are uncertain, most **scientists agree that doubling atmospheric CO2 concentrations may cause serious environmental consequences. Rising global temperatures could raise sea levels, change precipitation patterns and affect both weather and climate conditions**. In light of these potential impacts,**strategies to** help **reverse these emission trends are increasing in importance**. Many state, national and international governments are taking steps to more effectively manage and slow the growth of their carbon emissions. For many of these governments, **terrestrial sequestration is part of a portfolio of approaches to** inventory and **reduce GHG emissions**. Their experience is demonstrating that **establishing new forests can offer cost-effective management options for offsetting carbon emissions, particularly in the near future**[BB2] .

**Solves warming, biodiversity, and a litany of other impacts**

**EPA 12** (United States Environmental Protection Agency, OSRTI Abandoned Minelands Team, “ Carbon Sequestration through Reforestation A LOCAL SOLUTION WITH GLOBAL IMPLICATIONS ”, March 2012,[www.epa.gov/aml/revital/cseqfact.pdf](http://www.epa.gov/aml/revital/cseqfact.pdf%22%20%5Ct%20%22_blank)) KH

**Improvements in air quality generated by reforestation extend beyond the sequestration of CO2** . Research has shown that reforestation benefits air quality in other ways. For example, **the leaf and needle surfaces of trees remove air pollutants such as nitrogen oxides, ammonia and sulfur dioxide**. Trees also play a role in intercepting and filtering particulate matter in the air. A study of Chicago’s air quality concluded that the **city’s trees alone produced $9.2 million** (1994 dollars) **worth of air quality improvements in just one year**. Wildlife Habitat **Reforestation of land after it has been disturbed by surface mining can create** valuable **wildlife habita**t. In turn, **wildlife habitat generates forest litter, which** is an important part of the food chain and **enriches the soil. A forest’s tree canopy moderates the temperatures of rivers and streams, which aids the survival of aquatic species. Providing habitat for endangered and threatened species is another potential benefit**. In some cases, there are government incentives for landowners who restore or create habitat for endangered species. For example, the state of Texas has partnered with the U.S. Fish and Wildlife Service to reimburse landowners for habitat restoration. In this program, landowners can be reimbursed for up to 75 percent of their costs for habitat improvements. 3 Recreational Benefits For local communities, reforested land may provide passive recreational opportunities, such as hunting, hiking and bird watching. Erosion and Water Quality **Reforestation can help remediate former mine lands by improving water quality. Tree roots stabilize mine land soil, which is susceptible to erosion. By stabilizing the soil, trees prevent sediment and nutrients from washing into nearby streams and rivers**. 2 According to an expert on the economics of terrestrial carbon sequestration, “Large-scale forest-based carbon sequestration can be a cost-effective tool that should be considered seriously by policy makers.” State Mine Reclamation Guidelines that Encourage Wildlife Habitat Some states have established mine reclamation guidelines to encourage the enhancement of fish and wildlife habitat. Kentucky’s AML reclamation policies discourage excessive grading and shaping of the land and encourage planting of native vegetation, including ground covers, that have high food value for wildlife and are compatible with tree growth. 4 Opportunities for Carbon Sequestration on AMLs Phytoremediation Revegetating former mining sites can provide phytoremediation services. Phytoremediation is the “use of vegetation for on-site treatment of contaminated soils, sediments, and water.” 4 Phytoremediation is less costly than many remediation approaches. However, the process requires considerable time and should be employed at sites where remediation can occur over a long period of time. For mining sites, phytoremediation should generally be viewed as part of a treatment train, and is generally a “polishing” step. It is important to recognize that planting trees for carbon sequestration does not equate to phytoremediation. Depending on the type of trees selected, reforesting an AML to generate carbon credits may do nothing to extract or remediate any existing contamination at a site. However, some tree types may serve to phytostabilize the soluble metals in the ground water or soil as well as creating a more suitable growth environment on a formerly uninhabitable mine site. In such cases, there may be opportunities to jointly pursue carbon sequestration and phytoremediation.

**Afforestation solves warming**

 **Mujuri 07** (Elijah Kaberia, May 17, "DEFORESTATION AND AFFORESTATION, A WORLD PERSPECTIVE

With Three Case Studies in Brazil, Nigeria, and Japan", pdf)

Forests help maintain conditions that make life possible, from regional hydrological cycles to global climate changes (Bryant et al. 1997). While deforestation, degradation and poor forest management reduce carbon storage in forests, sustainable management, planting, and rehabilitation of forests can increase carbon sequestration. It is estimated that the world’s forests store 283 billion tons of carbon in their biomass alone, and that the carbon stored in forest biomass, deadwood, litter and soil together is roughly 50 percent more than the amount of carbon in the atmosphere. Carbon in forest biomass decreased in Africa, Asia and South America in the period 1990-2005, but increased in all other regions. For the world as a whole, during this period, carbon stocks in forest biomass decreased by 1.1 billion tons of carbon annually. This was because of the continued deforestation and forest degradation, which was partly offset by forest expansion (including planting) and an increase in growing stock per hectare in some regions (Bryant et al. 1997, FAO 2005). Without forests, carbon oxidizes to carbon dioxide which is a greenhouse gas in the atmosphere, with a net effect of global warming (Bryant et al. 1997, FAO 2005). Deforestation between 1850 and 1990 released 122 billion metric tons of carbon dioxide into the atmosphere. The current rate of release is approximately 1.6 billion metric tons. Other sources of fossil fuel release about 6 billion metric tons of carbon dioxide per year (Urquhart et al. 2007, Bryant et al. 1997, FAO 2005, World Bank 1998). Thus, it is evident that the loss of natural forests around the world contributes more to global emissions each year than the transport sector. Curbing deforestation is a highly cost-effective way to reduce emissions. Some of the options to reduce carbon emission include increased energy efficiency, reduced energy demand, better transport and the use of green energy (UNEP 2007, FAO 2005). Tropical forests are the world’s reservoirs of ecosystem and biodiversity hotspots (Roper and Ralph 1999). They occupy approximately 2,000 million hectares and represent resources in the form of economic products and environmental services. By the close of the 20 th century, there were approximately 3,500 million hectares of forest land in the world, representing 27% of the land cover. Most of the tropical forests are in the developing countries (Roper and Ralph 1999). Deforestation of tropical forests is more than mere destruction of beautiful areas. With the current rate of deforestation, tropical rain forests will disappear within the next 100 years, with major effects on global climate change and the loss of many plants and animals from the face of the earth (Urquhart et al. 2007).

**Forestation effectively decreases CO2**

**Alsam, Gulnaz, Quraishi 11**-[Forestation for combating climate change and its adverse impacts, commercial and environmental opportunities Zahoor Aslam, Asia Gulnaz and Masood Quraishi Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad, Department of Forestry and Range Management, University of Agriculture, Faisalabadhttp://www.silc.com.au/wp-content/uploads/2011/08/Climate-Change-Paper-1-\_3\_.pdf]

Global environment is suffering from several problems. One of the greatest environmental issues is however climate change triggered by global warming. Many factors contribute to global warming and resulting problem of climate change, most important being increased atmospheric concentrations of greenhouse gases (GHGs) predominantly carbon dioxide. Global warming is likely to increase since civilization of the time is obliged to continue relying on fossil fuels as its primary energy source, at least through this century. Climate change impacts all aspects of world’s physical, biological and human systems and hence the human existence itself. Climate change mitigation scenarios involve reductions in the concentrations of greenhouse gases, either by reducing their sources or by increasing their sinks. It is emphasized that changes in land use patterns and management of natural and agricultural ecosystems, combined with commercial opportunities, can play a key role to increase the sink capacity, sequestering large amounts of carbon dioxide. Slowing down deforestation and promoting forestation are in particular useful because of large capacity of trees to sequester carbon dioxide. Moreover, forests do not need to be harvested and replanted each year with machinery that runs on fuel. Beneficial effects of trees on soil and surrounding environment and human and animal life are adequately proven. They have protective, productive and aesthetic values for us adding beauty across the landscape. Forestation promotes the restoration of watershed areas for the benefit of the water environment, soil protection, flood reduction, conservation of biodiversity and improvement in wildlife habitats. Forest cover also moderates extreme temperatures, decrease evapotranspiration and reverse land degradation and desertification. The effective role played by plants in environmental protection and amelioration has been immensely appreciated and planting campaigns form an integral and effective method amongst various environmental/ ameliorative measures. Trees can also help rehabilitate salt-affected land. Vegetation on salt-affected soils tends to reduce salt concentration in the top soil because of increased infiltration and reduced capillary rise of water. In most cases, forage can be produced from salt tolerant tress using land and water unsuitable for conventional crops. The use of fuel-wood from plantings will also save huge quantity of dung, which can enrich agricultural fields. Multiple tree species (and agro-forestry combinations) could be planted so that the converted land would provide multiple benefits to the communities. Some trees are productive, high yielding and of major economic interest. Their plantations are sustainable sources of raw materials necessary for a variety of industries, including energy production.

**Reforestation is key to solve warming**

**Alsam, Gulnaz, Quraishi 11**-[Forestation for combating climate change and its adverse impacts, commercial and environmental opportunities Zahoor Aslam, Asia Gulnaz and Masood Quraishi Nuclear Institute for Agriculture and Biology (NIAB), Faisalabad, Department of Forestry and Range Management, University of Agriculture, Faisalabadhttp://www.silc.com.au/wp-content/uploads/2011/08/Climate-Change-Paper-1-\_3\_.pdf]

Although the primary source of anthropogenic carbon dioxide emissions is the use of fossil fuels, deforestation, i.e. removal of a forest or stand of trees where the land is thereafter converted to a non-forest use, contributes significantly to net increase of atmospheric carbon dioxide. For example almost 20% (8 GtCO2/year) of total greenhouse-gas emissions were from deforestation in 2007. Therefore, slowing down deforestation and promote forestation is a critical step of an overall strategy to address both global warming and climate change. (Alig et al., 2005). It must be emphasized that forests do not need to be harvested and replanted each year with machinery that runs on fuel. To increase the capacity of forests to sequester and store carbon we need to maintain and enhance forestland base. Moreover what is good for forest health is good for carbon sequestration. Creating ideal conditions for growing trees also creates ideal opportunities for carbon sequestration. Whether we are interested in wood production or carbon sequestration, the forest-management approaches are similar. That means increasing leaf area, maintaining forest health, accelerating growth, and thinning forests to remove the less vigorous trees, leaving the rapidly growing trees. The climate-helping character of young forests should be a boon to society. Replanting the land with fast-growing, young trees quickly restores the forest canopy which continues the process of sequestering carbon. Two elements of strategies that could increase carbon sequestration potential are species selection and density management. While current research is aimed at maximizing the volumes of the commercial harvest, some results have shown that significant biomass gains can be achieved by modifying planting or spacing regimes. In addition to species selection and density management, increased planting instead of natural regeneration and seeding after harvesting can also increase carbon sequestration.

**Reforestation is key to solve warming**

**Alsam, Gulnaz, Quraishi 11**-[Forestation for combating climate change and its adverse impacts, commercial and environmental opportunities Zahoor Aslam, Asia Gulnaz and Masood Quraishi Nuclear Institute for Agriculture and Biology (NIAB), Department of Forestry and Range Management, University of Agriculture, Faisalabadhttp://www.silc.com.au/wp-content/uploads/2011/08/Climate-Change-Paper-1-\_3\_.pdf]

Trees act as natural filters as they remove (scavenge) pollutants from the atmosphere and thus improve the air quality by absorbing hazardous gases, particles and soot from the smoke. Global temperature is increasing because of green house effect; CO2 is one of the major components of green house gases. To prevent global warming, trees need to be planted in billions as they absorb CO2. Plantations act as pollution sinks in two ways – as air filters and as air ventilators. Trees cause air current and eddies that help to ventilate an area that might otherwise have very still air. The forest soil with its microbes and vegetative cover also acts as natural filters by absorbing noxious materials. A dense stand of plantation is helpful in absorbing and reducing noise and in mitigating effects of noise. Its significance may be gauged from the fact that noise increases blood pressure, pulse rate and affects the frame of mind leading to depression and dulling of one’s spirits, resulting in excessive fatigue, headaches and loss of hearing. A dense stand of plants with its flowers and foliage is ideal for mental recreation. In its quiet solitude, man finds peace and solace and the continuously changing views inside a plantation may divert him from the tension of daily life.

**Funding afforestation projects in developing countries solves warming**

**Michikazu,99** (Kojima, Member of Environment and Natural Resource Studies Group, Inter-disciplinary Studies Center, “Carbon Sequestration in Developing Countries:

 Lessons from Japanese Aid Project for Reforestation”)

There are hopes for the absorption of carbon dioxide by afforestation as a means of mitigating global warming. Forests absorb CO2, and even after trees are cut they will store carbon for decades if used as building materials. Using wood as biomass energy allows a reduction in the use of oil and other fossil fuels. Afforestation and subsequent uses of wood make it possible to slow the pace of global warming. Because afforestation costs less than energy conservation and other methods, it generates expectations as one way of coping with global warming. Additionally, it is believed that planting trees in developing countries will cost less and provide larger areas for afforestation than in developed countries. Accordingly, having developed countries fund afforestation in developing countries is regarded as a part of efforts to reduce CO2 emissions. But afforestation still does not have a clearly defined place in joint implementation (JI) and the clean development mechanism (CDM). The IPCC has been asked to evaluate afforestation as a carbon sink, and it is also under continuing consideration to determine a specific framework in the CDM. Meanwhile, a number of forest conservation and afforestation projects are underway as pilot phase projects for activities implemented jointly (AIJ). At the fourth FCCC Conference of the Parties held in Buenos Aires, there were reports on 95 projects as AIJ, 12 of which were forest conservation and afforestation projects. Forest conservation/recovery and afforestation projects account for 12.6% of the total number of projects, while in terms of GHG reduction and absorption they account for 52.2% (Table 1). Note, however, that the national park project implemented jointly by the U.S. and Costa Rica makes a very large contribution, with this project alone accounting for 35.5% of total reduction and absorption. And although not AIJ officially authorized by partner countries, Japanese NGOs and businesses are conducting afforestation activities in China and Indonesia in an effort to become AIJ. Since even before afforestation was conducted as a global warming remedy, developed countries had cooperated with afforestation in developing countries as part of their official development assistance. Under several projects inadequate consideration for local inhabitants led them to carry out grassland burnoffs and other acts that resulted in damage to afforested areas. In order to avoid such problems, forestry aid by developed countries and international organizations now attaches greater importance to how local inhabitants are affected by projects. Afforestation to deal with global warming emerged from the dissociation with this history of improvement in forestry projects. If large-scale afforestation is conducted to control global warming while ignoring the lessons of the past, it is possible that past problems will recur.

**Afforestation key to mitigate the impacts of warming**

**Mauldin and Plantinga 98**-[Thomas Mauldin Department of Resource Economics & Policy University of Maine Andrew J. Plantinga Department of Resource Economics & Policy University of Maine May 14, 1998; http://siti.feem.it/gnee/pap-abs/plantin.pdf]

Since the industrial revolution, human activities such as deforestation and the use of fossil fuels have contributed to a 25% increase in atmospheric CO2 concentrations (Trabalka 1985). Climatic scientists predict that continued buildup of CO2 and other greenhouse gases will lead to an approximate 3.5° increase in mean global temperatures during the next century. Global warming is predicted to have many consequences, including altered weather patterns and rising ocean levels. Approaches to reducing net CO2 emissions, and thereby mitigating the impacts of global warming, include improving energy efficiency, switching to fuels with lower carbon content, limiting deforestation, and afforestation (the establishment of trees on unforested land). Trees and other vegetation sequester carbon in the biomass and soils of forests through the photosynthetic conversion of CO2 to carbon (Birdsey 1996). Afforestation results in a net reduction of atmospheric CO2 concentrations because forest land generally stores more carbon than land in other uses such as agriculture. Previous studies have shown that afforestation can be an effective strategy to offset a portion of U.S. emissions (Marland 1988; Lashof & Tirpak 1989). Accordingly, afforestation is a component of the U.S. climate change action plan and the recent Kyoto Protocol explicitly recognizes the role of forests in mitigating CO2 emissions (Clinton & Gore 1993). The decision to implement an afforestation strategy should be based on the cost of afforestation relative to other CO2 mitigation approaches. The purpose of this study is to estimate the costs of afforestation programs in three U.S.

### Solves Faster

**Solves warming faster than the aff**

**EPA 12** (United States Environmental Protection Agency, OSRTI Abandoned Minelands Team, “ Carbon Sequestration through Reforestation A LOCAL SOLUTION WITH GLOBAL IMPLICATIONS ”, March 2012, www.epa.gov/aml/revital/cseqfact.pdf)

Before the Industrial Revolution, the concentration of greenhouse gases (GHGs) in the atmosphere remained relatively constant. Except for slow changes on a geological time scale, the absorption and release of carbon was kept in balance. During that time, changes in biomass and soil organic carbon were the main sources of fluctuation in atmospheric levels of carbon. By clearing forests and burning fossil fuels more rapidly than the carbon can be sequestered, industrialization may have altered this equilibrium. Currently, **human activity is directly** or indirectly **responsible for the release of six to seven billion metric tons of carbon annually.** Since before the Industrial Revolution, CO2 concentrations in the atmosphere have increased from 280 parts per million (ppm) to nearly 380 ppm in 2005. CO2 emissions from energy use are projected to increase between 40 to 110 percent between 2000 and 2030. Increases in atmospheric CO2 concentration may be generating increases in average global temperature and other climate change impacts. Although some of the effects of increased CO2 levels on the global climate are uncertain, most scientists agree that doubling atmospheric CO2 concentrations may cause serious environmental consequences. Rising global temperatures could raise sea levels, change precipitation patterns and affect both weather and climate conditions. In light of these potential impacts, strategies to help reverse these emission trends are increasing in importance. Many state, national and international governments are taking steps to more effectively manage and slow the growth of their carbon emissions. For many of these governments, terrestrial sequestration is part of a portfolio of approaches to inventory and reduce GHG emissions. Their experience is demonstrating that establishing new forests can offer cost-effective management options for offsetting carbon emissions**, particularly in the near future.**

### Solves Biodiversity

**Reforestation solves air quality and biodiversity**

**EPA 12** (“Carbon Sequestration through Reforestation” U.S. Environmental Protection Agency Office of Superfund Remediation and Technology Innovation, March 2012 <http://www.epa.gov/aml/revital/cseqfact.pdf>) MLR

What are the Benefits of AML Reforestation for Land Owners and Companies? **Environmental Benefits** Air Quality Improvements in air quality generated by reforestation extend beyond the sequestration of CO2. **Research has shown that reforestation benefits air quality** in other ways. For example, **the leaf and needle surfaces of trees remove air pollutants such as nitrogen oxides, ammonia and sulfur dioxide. Trees also play a role in intercepting and filtering particulate matter in the air.** A study of **Chicago’s** air quality concluded that the city’s **trees alone produced $9.2 million** (1994 dollars) **worth of air quality improvements in just one year**. Wildlife Habitat **Reforestation of land** after it has been disturbed by surface mining **can create valuable wildlife habitat.** In turn, **wildlife habitat generates forest litter, which is an important part of the food chain and enriches the soil. A forest’s tree canopy moderates the temperatures of rivers and streams, which aids the survival of aquatic species.**

###  AT Leakage

**Leakage has a small impact on overall emissions and is easily managed**

**Virgilio, et al. 10** – Forest Carbon Specialist, Forest Carbon Development Team – Marshall, Global Climate Change Team; Zerbock, Managing Director for The Nature Conservancy's Global Climate Change Team; Advisor, Climate Change Initiatives; Holmes, Wildlife Conservation Society (Nicole, Sarene, Olaf, and Christopher, “Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience.”The Nature Conservancy, Conservation International and Wildlife Conservation Society. 2010. <http://www.hedon.info/docs/REDD_Casebook-TNC-CI-WCS.pdf>) MLR

**Leakage can be managed and accounted for** Many **projects are** currently **managing leakage using a threefold strategy: 1) incorporating leakage prevention elements into project design and choice of location, 2) calculating leakage that is likely to occur through risk assessments and monitoring, and 3) discounting carbon benefits accordingly if leakage cannot be prevented.** Most **projects incorporate community development aspects into their design**, which provide options for community members to meet their needs without simply deforesting elsewhere. Some projects target degraded lands in their choice of location, which are unlikely to displace agriculture or timber harvest. Nonetheless, **even if leakage cannot be completely avoided, economic models and risk assessments have been developed and used to discount project carbon benefits and assure they remain real.**

###  AT Impermanence

**REDD projects have built-in capabilities to address impermanence**

**Virgilio, et al. 10** – Forest Carbon Specialist, Forest Carbon Development Team – Marshall, Global Climate Change Team; Zerbock, Managing Director for The Nature Conservancy's Global Climate Change Team; Advisor, Climate Change Initiatives; Holmes, Wildlife Conservation Society (Nicole, Sarene, Olaf, and Christopher, “Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience.”The Nature Conservancy, Conservation International and Wildlife Conservation Society. 2010. <http://www.hedon.info/docs/REDD_Casebook-TNC-CI-WCS.pdf>) MLR

Permanence refers to how robust a project is to potential risks that could reverse the carbon benefi ts of the project at a future date. **Although all sectors have the potential for impermanence** (see “Permanence in other Sectors” box for more information), **REDD projects face** particular **scrutiny due to an inflated perception of risk from poor management, fire, pests, etc. that can lead to the destruction of forests and the subsequent release of emissions.** The concept of permanence is the cause of much confusion mainly because of a lack of consensus about “how long is permanent” and inconsistencies with the way it is talked about across scale and scope. **There is** an inherent **risk of** partial or total **reversal of carbon benefits within all sectors,** forest carbon included, **attributable to both natural and anthropogenic causes** (e.g., changes in government). The magnitude of this risk, be it negligible or substantial, is particular to the place in which the activity is being carried out and to the drivers of deforestation, political situation, ecological conditions, socio-economic circumstances, economy, etc., and it is possible to quantifiably estimate this risk. In recognition of the risk of impermanence, **it is common** practice **for those undertaking REDD activities to implement strategies to prevent reversal of carbon benefits and design measures to account for the unlikely event of a reversal, which will ensure the credibility of generated carbon benefits.** First and foremost, it is important that all stakeholder interests (e.g., government, communities and business) are aligned with the long-term project objectives. Several **legal, financial and institutional tools** are available to both **prevent and manage the possibility of impermanence.** Specific approaches, such as the purchase of conservation easements (or similar contractual agreements), **creation of protected areas, community development and the establishment of endowments for project management and monitoring**, can help **ensure permanence.** ultimately, strategies must be tailored to the particular project site and situation.

###  AT Brazil

**Squo solves—USAID has partnered with Brazil to reforest**

**USAID 8** (“International Deforestation and Climate Change: Statement for the record by US Assistant Administrator for Economic Growth, Agriculture and Trade” USAID Press Release, March 23 2008 <http://www.illegal-logging.info/item_single.php?it_id=2657&it=news>) MLR

**The** long term **goal of USAID's forestry program in Brazil is to significantly increase the area of the Brazilian Amazon under sustainable forest management, reconciling the desire for economic growth with the need for healthy, working forests. USAID's partners provide training in forest auditing procedures and forest management techniques and a** major **opportunity exists to support the** newly established **Brazilian Forest Service by expanding on the long-standing relationship between USAID, the Brazilian Ministry of Environment, and the USDA Forest Service. USAID has helped place** an additional **1.4 million hectares of natural forest under sustainable management in the Brazilian Amazon.** With technical assistance from USAID partners, Conservation International and Instituto Raoni, Brazil also achieved the largest area of certified tropical forest in the world: an area of 1.5 million hectares of Amazonian forest has been certified for sustainable extraction of Brazil nuts by Kayapo indigenous communities in southern Para State. To date, nearly three million hectares of forest are under management plans or are certified for sustainable extraction. **Nearly 3,900 people were trained in sound forest management techniques in** FY **2006 and nearly 10,000 more were taught best practices**, including fire management and land use planning. Mr. Chairman, **USAID** is dedicated to applying our experience in the design of programs going forward**.** Thelong term success of USAID's development programs will depend upon how climate change is considered in planning and implementation. We **will work** with nations **to adapt to the impacts of climate change, strengthen resilience, disseminate tools and methodologies to improve vulnerability and adaptation assessments, and integrate adaptation into development.** By incorporating - mainstreaming - climate change into existing priority programs, **development success becomes** more **robust when viewed in the long term.**

### AT Food/Water DA

**It’s a triple win—reforestation mitigates climate change, solves biodiversity and spurs local economies**

**Virgilio, et al. 10** – Forest Carbon Specialist, Forest Carbon Development Team – Marshall, Global Climate Change Team; Zerbock, Managing Director for The Nature Conservancy's Global Climate Change Team; Advisor, Climate Change Initiatives; Holmes, Wildlife Conservation Society (Nicole, Sarene, Olaf, and Christopher, “Reducing Emissions from Deforestation and Degradation (REDD): A Casebook of On-the-Ground Experience.”The Nature Conservancy, Conservation International and Wildlife Conservation Society. 2010. <http://www.hedon.info/docs/REDD_Casebook-TNC-CI-WCS.pdf>) MLR

**Advances in technology and practical implementation experience have created a growing body of research and evidence that reducing carbon emissions through forest conservation can be a credible part of the fight against climate change** (IPCC, 2007c; FAO, 2005). **Existing projects**, spearheaded by organizations such as The Nature Conservancy (TNC), Conservation International (CI) and Wildlife Conservation Society (WCS), **have provided the basis for groundbreaking methodologies in estimating, preventing and mitigating leakage, setting project baselines, and verifying carbon benefits. These projects have not only resulted in climate change mitigation, but also valuable community and biodiversity benefits, creating a win-win-win situation**. This report explores the primary challenges in demonstrating this credibility, including:

**Reforestation solves the economy, food scarcity, and warming**

--also in 2NC reforestation solvency

**USAID 8** (“International Deforestation and Climate Change: Statement for the record by US Assistant Administrator for Economic Growth, Agriculture and Trade” USAID Press Release, March 23 2008 <http://www.illegal-logging.info/item_single.php?it_id=2657&it=news>) MLR

**Activities in the forest sector** address forests and climate change strategically. Our programs work to **reduce CO2 emissions from deforestation, promoting sustainable forest management and forest conservation, and increase CO2 sequestration through reforestation.** Activities seek the significant co-benefits of economic development and improved livelihoods that come from local economies that are diversified through productive integration of trees in agricultural lands, and sustainable use of existing forests. **Reforestation is a way to accomplish economic development, increase food security, meet energy needs, provide** environmental services like **improved water supply, and reduce sources of conflict.**

### Key to Economy

**Reforestation is key to the economy—provides a short-term stimulus and creates long-term jobs and industries**

**Nair and Rutt 9** – Chief Economist and Consultant in the Forest Economics and Policy Division, Forestry Department, FAO, Rome (C.T.S. and Rebecca, “Creating forestry jobs to boost the economy and build a green future” nineteenth session of the FAO Committee on Forestry, 20 March 2009, http://www.fao.org/docrep/012/i1025e/i1025e02.htm)

Rapidly **escalating unemployment and its** social and **economic consequences are a major concern as countries grapple with the ongoing economic crisis. Sustainable forest management could become an integral component of employment generation efforts and offers** some **unique advantages in fulfilling a number of economic**, social and environmental **objectives. Targeted public investments could generate about 10 million new jobs in** afforestation, **reforestation**, management of natural forests, establishment and management of urban and peri-urban green spaces, improvement of watersheds, protection of forests from fire and building roads, trails and recreation sites. Such **investments could absorb unemployed or recently dismissed workers, increasing their income and consumption and** contributing to **arresting the downward economic spiral**. Most of **these jobs would be in rural areas, where they would help raise living standards**. More importantly, **such investments could help rebuild natural assets that have been severely depleted** in the past. **Unemployment and lack of income have been major factors contributing to deforestation and forest degradation in most countries. Employment in sustainable forest management thus has a double benefit:** while it builds the natural asset base, it also reduces the deforestation and degradation that often occur when other income-earning opportunities are absent. Based on the current costs of sustainable forest management activities, **10 million jobs could help to establish, restore or improve about 8 to 10 million hectares of forests and woodlands, reversing deforestation and degradation**. Such employment would also strengthen the management of protected areas, improve watersheds, create new urban and peri-urban green spaces and reduce the incidence of fire. **The establishment of new forests and woodlands and improved management of existing forests would directly contribute to climate change mitigation and adaptation.** Both the reduction in deforestation and the establishment of new planted forests and farm woodlots would improve carbon sequestration and storage. Improved fuel management could reduce the incidence and severity of forest fires, further helping to reduce carbon emissions. **Employment in forestry activities can provide a much-needed “quick-fix”.** **By rebuilding the natural resource base and enhancing the supply of goods and services, the initial investments will** also **pave the way for long-term employment. A number of countries have already included forestry as an important component of their current economic stimulus packages, with particular focus on job creation.** Stepping up of such efforts by all countries could have positive economic, social and environmental impacts. New jobs will be tailored to the specific conditions in each country, to make the most of local resources and institutional capacities.

**Reforestation is a key job creator**

**Nair and Rutt 9** – Chief Economist and Consultant in the Forest Economics and Policy Division, Forestry Department, FAO, Rome (C.T.S. and Rebecca, “Creating forestry jobs to boost the economy and build a green future” nineteenth session of the FAO Committee on Forestry, 20 March 2009, http://www.fao.org/docrep/012/i1025e/i1025e02.htm)

**Afforestation and reforestation**, including reclamation of degraded or desertified lands, **offer the greatest scope for job creation, particularly where rural unemployment or underemployment is high and vast tracts of degraded land are available. Land preparation, production of planting material and planting and maintenance, adapted to the specific local conditions, knowledge and skills, could be important sources of employment. Most countries have** substantial **experience in afforestation and reforestation and could scale up these activities. Annual plantation establishment** (excluding assisted regeneration in semi-natural forests) **is about 2.5 million hectares** (FAO, 2006). Taking into account the availability of suitable land and the institutional capacity, **the rate of establishment of productive and protective plantations could be doubled or tripled annually.**

**Forestry is key to the economy—massive employment**

**Nair and Rutt 9** – Chief Economist and Consultant in the Forest Economics and Policy Division, Forestry Department, FAO, Rome (C.T.S. and Rebecca, “Creating forestry jobs to boost the economy and build a green future” nineteenth session of the FAO Committee on Forestry, 20 March 2009, http://www.fao.org/docrep/012/i1025e/i1025e02.htm)

**Job creation remains the foremost concern for most countries as economies contract and joblessness increases.** As the credit squeeze reduces fund availability, much of the focus will be on job creation in sectors with high labour–capital ratios**. Forestry’s potential for employment generation stems from several factors**: Low capital requirements. With the exception of some forest industries such as pulp and paper and panel products, **forestry is labour intensive with relatively low capital investment.** Labour and land are the key inputs in the production of wood and non-wood forest products, and **environmental services and investments in upstream** (primary) **forestry activities** are able to **generate more jobs than most other sectors. An annual outlay of US$1 million in forest management** (including agroforestry) **could generate from 500 to 1 000 jobs in many developing countries,** and 20 to 100 in most developed and middle-income countries. Multiplier effect. **Since a major share of a worker’s income goes to the purchase of goods and services**, mainly at the local level, **every one job created in forestry generates an additional 1.5 to 2.5 jobs in the economy.** Flexibility and adaptability in diverse situations. **The variety of the tasks required and the levels of technology available offer various employment options.** For example, planting could be undertaken as an extremely labour-intensive operation if there are no labour constraints, or it could be partially mechanized depending on the relative costs of labour and other inputs. **There is a long history of job generation through public investments in forestry** (see Box). Although the current situation differs from past economic downturns**, a number of countries have included job creation in forestry as an integral part of their economic recovery plans – for example Canada, Chile, China** (see article by Ma, Liu and Du in this issue), **India** (see article by Matta), **the Republic of Korea and the U**nited **S**tates (see article by Kimbell and Brown).

**Forestry is key to economic stabilization—jobs and natural capital**

**Nair and Rutt 9** – Chief Economist and Consultant in the Forest Economics and Policy Division, Forestry Department, FAO, Rome (C.T.S. and Rebecca, “Creating forestry jobs to boost the economy and build a green future” nineteenth session of the FAO Committee on Forestry, 20 March 2009, http://www.fao.org/docrep/012/i1025e/i1025e02.htm)

**In the forest sector, the economic downturn presents** particular **challenges** (FAO, 2009). **The slump in the construction sector**, especially in many developed countries (for example in the United States of America, where annual housing starts declined by about 80 percent between January 2006 and January 2009), **led to a drastic reduction in demand for wood products. Production, trade and employment have been scaled down in response** to the low demand. Since the construction sector is a major employer (including for migrant workers), its decline has contributed substantially to increased unemployment. **Growing rural unemployment could increase pressure on forests and woodlands, leading to deforestation and degradation.** Declining demand for wood and wood products could also reduce investments in sustainable forest management by governments, industries and smallholders, adversely affecting future wood supplies and environmental services. **In response** to the economic crisis, a number of **governments have initiated economic stimulus packages to bail out financial institutions and to stimulate production and consumption**. By early 2009, the total value of the various stimulus packages amounted to over US$3 trillion (Gallagher, 2009). **Employment generation through public works is an important thrust of many of the stimulus packages. An increase in jobs is expected to enhance income, increase consumption and thus stimulate production and further employment, helping to break the downward spiral**. The **strategies** of a number of countries **emphasize movement towards a green future,** with the aim of stimulating sectors that will create real assets, improve energy efficiency, increase the use of renewable resources and combat climate change. **Forestry could have a positive role in the economic stabilization efforts, particularly through job creation and the rebuilding of the natural capital base.**

### 2NC—Avoids Politics

**Avoids politics**

**Kooten et al. 97**

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Thus, **countries can be loosely classified into those that will more than likely benefit from global climate change, those that will likely be net losers, and those who could be either net gainers or net losers**—the uncertainty is simply too great to know either way. In addition, there is uncertainty about how countries will be affected, in the long term, by any global accord that they sign. As uncertainty about any of the risk categories identified above increases and countries are not sure into which of the loser-gainer categories they fall, the greater will be the ambiguity and vagueness of a global accord to which they will agree. Ambiguity and vagueness can be found in any of the elements of an accord, including targets, penalties, enforcement, and so on. **It is understandable, therefore, that taking no action at all, or taking no action to significantly cut fossil fuel use, can become a political priority. This makes forest-based mitigation strategies seem attractive, because by offsetting emissions from fossil fuels they allow a country to cut its net carbon emissions while maintaining politically acceptable rates of fossil fuel use. Many governments would find it politically impossible to make heavy cuts in fossil fuel use because of the impact on national economic growth rates, and thereby on budgets. Policies that conserve existing forests or result in tree planting to increase the country's annual carbon sequestration rate enable a country to "buy time", while the magnitude of climate change becomes clearer and the search continues for technological solutions that have less drastic effects on the national economy. Implementing forest-sector policies also enables countries to be seen as doing something about a global problem,** while not relinguishing freedom to pursue domestic policies, including ones that might increase CO2 emissions (e.g., regional subsidies to develop coal or oil deposits). Any additional cost of forest-based mitigation is offset by the huge opportunity costs of making too drastic a cut in fossil fuel use. Finally, while having climate benefits, protecting forest ecosystems, planting trees and investing in silviculture are politically attractive policies because they satisfy other objectives of governments, such as appeasing environmentalists and protecting forest sector jobs.