# De-Dev

[De-Dev 1](#_Toc331333236)

[1NC DeDev 4](#_Toc331333237)

[Collapse Inevitable 7](#_Toc331333238)

[2NC Collapse Inevitable 8](#_Toc331333239)

[Collapse Inevitable 14](#_Toc331333240)

[Collapse Inevitable 17](#_Toc331333241)

[Collapse Inevitable 21](#_Toc331333242)

[Collapse Inevitable 22](#_Toc331333243)

[Collapse Inevitable – AT: Tricky Econ 24](#_Toc331333244)

[Collapse Inevitable – AT: Tech 26](#_Toc331333245)

[Collapse Inevitable – AT: Market Solves 27](#_Toc331333246)

[Collapse Inevitable – AT: System Reform 29](#_Toc331333247)

[Collapse Inevitable – AT: Transition Now 31](#_Toc331333248)

[Collapse Now Good 32](#_Toc331333249)

[Collapse Now Good – Warming 33](#_Toc331333250)

[Collapse Now Good – Revolution 35](#_Toc331333251)

[Collapse Now Good – Complexity 38](#_Toc331333252)

[Collapse Now Good – Precautionary Principle 40](#_Toc331333253)

[Collapse Now Good – Learning 45](#_Toc331333254)

[Collapse Now Good – Mindset Shift 47](#_Toc331333255)

[AT: Regrowth 48](#_Toc331333256)

[AT: Elite Backlash 50](#_Toc331333257)

[AT: Human Nature 51](#_Toc331333258)

[AT: Human Nature 54](#_Toc331333259)

[AT: Human Nature 55](#_Toc331333260)

[Growth Bad – Environment 56](#_Toc331333261)

[Growth Bad – Environment 57](#_Toc331333262)

[Growth Bad – Environment 58](#_Toc331333263)

[Growth Bad – Linear Impacts 60](#_Toc331333264)

[Growth Bad – Resource Depletion 61](#_Toc331333265)

[Growth Bad – Endocrine Disruptors 64](#_Toc331333266)

[Yes BD Loss 65](#_Toc331333267)

[Biodiversity Theory True 66](#_Toc331333268)

[Yes Tipping Point 68](#_Toc331333269)

[AT: Growth Good – Kuznets Curve 69](#_Toc331333270)

[AT: Growth Good – Decoupling 72](#_Toc331333271)

[AT: Growth Good – Decoupling 73](#_Toc331333272)

[AT: Growth Good – Decoupling 74](#_Toc331333273)

[AT: Growth Good – Tech 76](#_Toc331333274)

[AT: Growth Good – Tech 80](#_Toc331333275)

[AT: Growth Good – Tech 81](#_Toc331333276)

[AT: Growth Good – Tech 82](#_Toc331333277)

[AT: Growth Good – Tech 83](#_Toc331333278)

[AT: Growth Good – Green Transition 84](#_Toc331333279)

[AT: Growth Good – Renewables 85](#_Toc331333280)

[AT: Growth Good – Efficiency 88](#_Toc331333281)

[AT: Bio-Sphere Engineering 89](#_Toc331333282)

[AT: Bio-Sphere Engineering 90](#_Toc331333283)

[Environmental Destruction Bad – War 92](#_Toc331333284)

[AT: Growth Good – Heg 93](#_Toc331333285)

[AT: Growth Good – Heg 94](#_Toc331333286)

[AT: Growth Good – Space 95](#_Toc331333287)

[AT: Space 96](#_Toc331333288)

[AT: Space – Impossible 98](#_Toc331333289)

[AT: Asteroids 100](#_Toc331333290)

[Growth Bad – War 101](#_Toc331333291)

[1NC Growth Bad – War 102](#_Toc331333292)

[Growth Bad – War 104](#_Toc331333293)

[Growth Bad – War 105](#_Toc331333294)

[Growth Bad – War 106](#_Toc331333295)

[Growth Bad – War 108](#_Toc331333296)

[Growth Bad – War 109](#_Toc331333297)

[AT: Transition Wars 110](#_Toc331333298)

[AT: Growth Solves War 111](#_Toc331333299)

[AT: Interdependence 113](#_Toc331333300)

[AT: Diversionary Wars 114](#_Toc331333301)

[Nuclear War 115](#_Toc331333302)

[2NC NW Doesn’t Cause Extinction 116](#_Toc331333303)

[Growth Bad – China 117](#_Toc331333304)

[Growth Bad – China 118](#_Toc331333305)

[Growth Bad – China 119](#_Toc331333306)

[Growth Bad – Terrorism 120](#_Toc331333307)

[Growth Bad – Terrorism 121](#_Toc331333308)

[AT: Growth Good – Random 122](#_Toc331333309)

[AT: Growth Good – Happiness 123](#_Toc331333310)

[AT: Growth Good – Happiness 125](#_Toc331333311)

[AT: Growth Good – Singularity 127](#_Toc331333312)

[AT: Growth Good – Singularity 130](#_Toc331333313)

[Aff 132](#_Toc331333314)

[Yes Transition 133](#_Toc331333315)

[Yes Transition 136](#_Toc331333316)

[Growth Inevitable – Human Nature 137](#_Toc331333317)

[Growth Inevitable – Human Nature 139](#_Toc331333318)

[AT: Collapse Inevitable 140](#_Toc331333319)

[AT: Collapse Inevitable – Peak Oil 144](#_Toc331333320)

[AT: Collapse Inevitable – Resources 145](#_Toc331333321)

[AT: Collapse Inevitable – K-Waves 147](#_Toc331333322)

[Collapse Bad – Regrowth 148](#_Toc331333323)

[Collapse Bad – Transition Wars 149](#_Toc331333324)

[Collapse Bad – Transition Wars 150](#_Toc331333325)

[Collapse Bad – Transition Wars 152](#_Toc331333326)

[Collapse Bad – Environment 153](#_Toc331333327)

[Growth Good – Environment 154](#_Toc331333328)

[Growth Good – Environment 156](#_Toc331333329)

[Growth Good – Environment 157](#_Toc331333330)

[Growth Good – Singularity 159](#_Toc331333331)

[Growth Good – Try or Die 161](#_Toc331333332)

[Growth Good – Environment 162](#_Toc331333333)

[Growth Good – Wars 163](#_Toc331333334)

[Growth Good – Wars 164](#_Toc331333335)

[AT: Resource Wars 165](#_Toc331333336)

### 1NC DeDev

#### Collapse of the global economy is inevitable

Thomas Homer-Dixon, holds the Centre for International Governance Innovation Chair of Global Systems at the Balsillie School of International Affairs in Waterloo, Ontario, and is a Professor in the Centre for Environment and Business in the Faculty of Environment, University of Waterloo, January/February 2011, “Unconventional Wisdom: ECONOMIES CAN'T JUST KEEP ON GROWING,” Foreign Policy, www.foreignpolicy.com/articles/2011/01/02/unconventional\_wisdom?page=0,1

Humanity has made great strides over the past 2,000 years, and we often assume that our path, notwithstanding a few bumps along the way, goes ever upward. But we are wrong: Within this century, environmental and resource constraints will likely bring global economic growth to a halt. Limits on available resources already restrict economic activity in many sectors, though their impact usually goes unacknowledged. Take rare-earth elements -- minerals and oxides essential to the manufacture of many technologies. When China recently stopped exporting them, sudden shortages threatened to crimp a wide range of industries. Most commentators believed that the supply crunch would ease once new (or mothballed) rare-earth mines are opened. But such optimism overlooks a fundamental physical reality. As the best bodies of ore are exhausted, miners move on to less concentrated deposits in more difficult natural circumstances. These mines cause more pollution and require more energy. In other wordsfv, opening new rare-earth mines outside China will result in staggering environmental impact. Or consider petroleum, which provides about 40 percent of the world's commercial energy and more than 95 percent of its transportation energy. Oil companies generally have to work harder to get each new barrel of oil. The amount of energy they receive for each unit of energy they invest in drilling has dropped from 100 to 1 in Texas in the 1930s to about 15 to 1 in the continental United States today. The oil sands in Alberta, Canada, yield a return of only 4 to 1. Coal and natural gas still have high energy yields. So, as oil becomes harder to get in coming decades, these energy sources will become increasingly vital to the global economy. But they're fossil fuels, and burning them generates climate-changing carbon dioxide. If the World Bank's projected rates for global economic growth hold steady, global output will have risen almost tenfold by 2100, to more than $600 trillion in today's dollars. So even if countries make dramatic reductions in carbon emissions per dollar of GDP, global carbon dioxide emissions will triple from today's level to more than 90 billion metric tons a year. Scientists tell us that tripling carbon emissions would cause such extreme heat waves, droughts, and storms that farmers would likely find they couldn't produce the food needed for the world's projected population of 9 billion people. Indeed, the economic damage caused by such climate change would probably, by itself, halt growth. Humankind is in a box. For the 2.7 billion people now living on less than $2 a day, economic growth is essential to satisfying the most basic requirements of human dignity. And in much wealthier societies, people need growth to pay off their debts, support liberty, and maintain civil peace. To produce and sustain this growth, they must expend vast amounts of energy. Yet our best energy source -- fossil fuel -- is the main thing contributing to climate change, and climate change, if unchecked, will halt growth.

#### Decline solves warming – causes extinction.

Minqi Li, Assistant Professor Department of Economics, University of Utah, 2010, “The 21st Century Crisis: Climate Catastrophe or Socialism” Paper prepared for the David Gordon Memorial Lecture at URPE Summer Conference 2010.

The global average surface temperature is now about 0.8C (0.8 degree Celsius) higher than the pre-industrial time. Under the current trend, the world is on track towards a long-term warming between 4C and 8C. At this level of global warming, the world would be in an extreme greenhouse state not seen for almost 100 million years, devastating human civilization and destroying nearly all forms of life on the present earth (Conner and McCarthy 2009). The scientific community has reached the consensus that the current global warming results from the excessive accumulation in the atmosphere of carbon dioxide (CO2) and other greenhouse gases (such as methane and nitrous oxide) emitted by human economic activities. The capitalist historical epoch has been characterized by the explosive growth of material production and consumption. The massive expansion of the world economy has been powered by fossil fuels (coal, oil, and natural gas). Since 1820, the world economy has expanded by about seventy times and the world emissions of carbon dioxide from fossil fuels burning have increased by about sixty times (see Figure 1). At the United Nations conference on climate change concluded at Copenhagen in December 2009, the world’s governments officially committed to the objective of limiting global warming to no more than 2C. However, according to the “Climate Action Tracker”, despite the official statement, the national governments’ current pledges regarding emission reduction in fact imply a warming of at least 3C by the end of the 21st century with more warming to come in the following centuries (Climate Action Tracker 2010). In reality, all the major national governments are committed to infinite economic growth and none of them is willing to consider any emission reduction policy that could undermine economic growth. This is not simply because of intellectual ignorance or lack of political will. The pursuit of endless accumulation of capital (and infinite economic growth) is derived from the basic laws of motion of the capitalist economic system. Without fundamental social transformation, human civilization is now on the path to self-destruction. The next section (Section 2) reviews the basic scientific facts concerning the climate change crisis. Without an end of economic growth, it is virtually impossible for meaningful climate stabilization to be achieved (Section 3). However, both capitalist enterprises and states are constantly driven to expand production and consumption. The system of nation states effectively rules out a meaningful global political solution to the climate change crisis (Section 4). The climate change crisis is but one of several long-term historical trends that are now leading to the structural crisis of capitalism (Section 5). The resolution of the crisis and the survival of the humanity require the building of a fundamentally different social system that is based on social ownership of the means of production and society-wide planning (Section 6).

#### Collapse now better than later – stops extinction.

Glen Barry, Ph.D. in Land Resources from the University of Wisconsin-Madison, MS in Conservation Biology and Sustainable Development from Madison, Founder and President of Ecological Internet, 1-14-2008, “Economic Collapse and Global Ecology,” http://www.countercurrents.org/barry140108.htm

Given widespread failure to pursue policies sufficient to reverse deterioration of the biosphere and avoid ecological collapse, the best we can hope for may be that the growth-based economic system crashes sooner rather than later Humanity and the Earth are faced with an enormous conundrum -- sufficient climate policies enjoy political support only in times of rapid economic growth. Yet this growth is the primary factor driving greenhouse gas emissions and other environmental ills. The growth machine has pushed the planet well beyond its ecological carrying capacity, and unless constrained, can only lead to human extinction and an end to complex life. With every economic downturn, like the one now looming in the United States, it becomes more difficult and less likely that policy sufficient to ensure global ecological sustainability will be embraced. This essay explores the possibility that from a biocentric viewpoint of needs for long-term global ecological, economic and social sustainability; it would be better for the economic collapse to come now rather than later. Economic growth is a deadly disease upon the Earth, with capitalism as its most virulent strain. Throw-away consumption and explosive population growth are made possible by using up fossil fuels and destroying ecosystems. Holiday shopping numbers are covered by media in the same breath as Arctic ice melt, ignoring their deep connection. Exponential economic growth destroys ecosystems and pushes the biosphere closer to failure. Humanity has proven itself unwilling and unable to address climate change and other environmental threats with necessary haste and ambition. Action on coal, forests, population, renewable energy and emission reductions could be taken now at net benefit to the economy. Yet, the losers -- primarily fossil fuel industries and their bought oligarchy -- successfully resist futures not dependent upon their deadly products. Perpetual economic growth, and necessary climate and other ecological policies, are fundamentally incompatible. Global ecological sustainability depends critically upon establishing a steady state economy, whereby production is right-sized to not diminish natural capital. Whole industries like coal and natural forest logging will be eliminated even as new opportunities emerge in solar energy and environmental restoration. This critical transition to both economic and ecological sustainability is simply not happening on any scale. The challenge is how to carry out necessary environmental policies even as economic growth ends and consumption plunges. The natural response is going to be liquidation of even more life-giving ecosystems, and jettisoning of climate policies, to vainly try to maintain high growth and personal consumption. We know that humanity must reduce greenhouse gas emissions by at least 80% over coming decades. How will this and other necessary climate mitigation strategies be maintained during years of economic downturns, resource wars, reasonable demands for equitable consumption, and frankly, the weather being more pleasant in some places? If efforts to reduce emissions and move to a steady state economy fail; the collapse of ecological, economic and social systems is assured. Bright greens take the continued existence of a habitable Earth with viable, sustainable populations of all species including humans as the ultimate truth and the meaning of life. Whether this is possible in a time of economic collapse is crucially dependent upon whether enough ecosystems and resources remain post collapse to allow humanity to recover and reconstitute sustainable, relocalized societies. It may be better for the Earth and humanity's future that economic collapse comes sooner rather than later, while more ecosystems and opportunities to return to nature's fold exist. Economic collapse will be deeply wrenching -part Great Depression, part African famine. There will be starvation and civil strife, and a long period of suffering and turmoil. Many will be killed as balance returns to the Earth. Most people have forgotten how to grow food and that their identity is more than what they own. Yet there is some justice, in that those who have lived most lightly upon the land will have an easier time of it, even as those super-consumers living in massive cities finally learn where their food comes from and that ecology is the meaning of life. Economic collapse now means humanity and the Earth ultimately survive to prosper again. Human suffering -- already the norm for many, but hitting the currently materially affluent -- is inevitable given the degree to which the planet's carrying capacity has been exceeded. We are a couple decades at most away from societal strife of a much greater magnitude as the Earth's biosphere fails. Humanity can take the bitter medicine now, and recover while emerging better for it; or our total collapse can be a final, fatal death swoon.

## Collapse Inevitable

### 2NC Collapse Inevitable

#### Complexity theory – we can’t innovate our way out of shortages – diminishing returns

Debora MacKenzie, science journalist who writes regularly in New Scientist and other publications, 4-2008, “Why the demise of civilisation may be inevitable,” Climate Ark, http://www.climateark.org/shared/reader/welcome.aspx?linkid=97741

DOOMSDAY. The end of civilisation. Literature and film abound with tales of plague, famine and wars which ravage the planet, leaving a few survivors scratching out a primitive existence amid the ruins. Every civilisation in history has collapsed, after all. Why should ours be any different? Doomsday scenarios typically feature a knockout blow: a massive asteroid, all-out nuclear war or a catastrophic pandemic (see "Will a pandemic bring down civilisation?"). Yet there is another chilling possibility: what if the very nature of civilisation means that ours, like all the others, is destined to collapse sooner or later? A few researchers have been making such claims for years. Disturbingly, recent insights from fields such as complexity theory suggest that they are right. It appears that once a society develops beyond a certain level of complexity it becomes increasingly fragile. Eventually, it reaches a point at which even a relatively minor disturbance can bring everything crashing down. Some say we have already reached this point, and that it is time to start thinking about how we might manage collapse. Others insist it is not yet too late, and that we can - we must - act now to keep disaster at bay. Environmental mismanagement History is not on our side. Think of Sumeria, of ancient Egypt and of the Maya. In his 2005 best-seller Collapse, Jared Diamond of the University of California, Los Angeles, blamed environmental mismanagement for the fall of the Mayan civilisation and others, and warned that we might be heading the same way unless we choose to stop destroying our environmental support systems. Lester Brown of the Earth Policy Institute in Washington DC agrees. He has long argued that governments must pay more attention to vital environmental resources. "It's not about saving the planet. It's about saving civilisation," he says. Others think our problems run deeper. >From the moment our ancestors started to settle down and build cities, we have had to find solutions to the problems that success brings. "For the past 10,000 years, problem solving has produced increasing complexity in human societies," says Joseph Tainter, an archaeologist at Utah State University, Logan, and author of the 1988 book The Collapse of Complex Societies. If crops fail because rain is patchy, build irrigation canals. When they silt up, organise dredging crews. When the bigger crop yields lead to a bigger population, build more canals. When there are too many for ad hoc repairs, install a management bureaucracy, and tax people to pay for it. When they complain, invent tax inspectors and a system to record the sums paid. That much the Sumerians knew. Diminishing returns There is, however, a price to be paid. Every extra layer of organisation imposes a cost in terms of energy, the common currency of all human efforts, from building canals to educating scribes. And increasing complexity, Tainter realised, produces diminishing returns. The extra food produced by each extra hour of labour - or joule of energy invested per farmed hectare - diminishes as that investment mounts. We see the same thing today in a declining number of patents per dollar invested in research as that research investment mounts. This law of diminishing returns appears everywhere, Tainter says. To keep growing, societies must keep solving problems as they arise. Yet each problem solved means more complexity. Success generates a larger population, more kinds of specialists, more resources to manage, more information to juggle - and, ultimately, less bang for your buck. Eventually, says Tainter, the point is reached when all the energy and resources available to a society are required just to maintain its existing level of complexity. Then when the climate changes or barbarians invade, overstretched institutions break down and civil order collapses. What emerges is a less complex society, which is organised on a smaller scale or has been taken over by another group. Tainter sees diminishing returns as the underlying reason for the collapse of all ancient civilisations, from the early Chinese dynasties to the Greek city state of Mycenae. These civilisations relied on the solar energy that could be harvested from food, fodder and wood, and from wind. When this had been stretched to its limit, things fell apart. An ineluctable process Western industrial civilisation has become bigger and more complex than any before it by exploiting new sources of energy, notably coal and oil, but these are limited. There are increasing signs of diminishing returns: the energy required to get each new joule of oil is mounting and although global food production is still increasing, constant innovation is needed to cope with environmental degradation and evolving pests and diseases - the yield boosts per unit of investment in innovation are shrinking. "Since problems are inevitable," Tainter warns, "this process is in part ineluctable." Is Tainter right? An analysis of complex systems has led Yaneer Bar-Yam, head of the New England Complex Systems Institute in Cambridge, Massachusetts, to the same conclusion that Tainter reached from studying history. Social organisations become steadily more complex as they are required to deal both with environmental problems and with challenges from neighbouring societies that are also becoming more complex, Bar-Yam says. This eventually leads to a fundamental shift in the way the society is organised. "To run a hierarchy, managers cannot be less complex than the system they are managing," Bar-Yam says. As complexity increases, societies add ever more layers of management but, ultimately in a hierarchy, one individual has to try and get their head around the whole thing, and this starts to become impossible. At that point, hierarchies give way to networks in which decision-making is distributed. We are at this point. This shift to decentralised networks has led to a widespread belief that modern society is more resilient than the old hierarchical systems. "I don't foresee a collapse in society because of increased complexity," says futurologist and industry consultant Ray Hammond. "Our strength is in our highly distributed decision making." This, he says, makes modern western societies more resilient than those like the old Soviet Union, in which decision making was centralised. Increasing connectedness Things are not that simple, says Thomas Homer-Dixon, a political scientist at the University of Toronto, Canada, and author of the 2006 book The Upside of Down. "Initially, increasing connectedness and diversity helps: if one village has a crop failure, it can get food from another village that didn't." As connections increase, though, networked systems become increasingly tightly coupled. This means the impacts of failures can propagate: the more closely those two villages come to depend on each other, the more both will suffer if either has a problem. "Complexity leads to higher vulnerability in some ways," says Bar-Yam. "This is not widely understood." The reason is that as networks become ever tighter, they start to transmit shocks rather than absorb them. "The intricate networks that tightly connect us together - and move people, materials, information, money and energy - amplify and transmit any shock," says Homer-Dixon. "A financial crisis, a terrorist attack or a disease outbreak has almost instant destabilising effects, from one side of the world to the other." For instance, in 2003 large areas of North America and Europe suffered blackouts when apparently insignificant nodes of their respective electricity grids failed. And this year China suffered a similar blackout after heavy snow hit power lines. Tightly coupled networks like these create the potential for propagating failure across many critical industries, says Charles Perrow of Yale University, a leading authority on industrial accidents and disasters. Credit crunch Perrow says interconnectedness in the global production system has now reached the point where "a breakdown anywhere increasingly means a breakdown everywhere". This is especially true of the world's financial systems, where the coupling is very tight. "Now we have a debt crisis with the biggest player, the US. The consequences could be enormous." "A networked society behaves like a multicellular organism," says Bar-Yam, "random damage is like lopping a chunk off a sheep." Whether or not the sheep survives depends on which chunk is lost. And while we are pretty sure which chunks a sheep needs, it isn't clear - it may not even be predictable - which chunks of our densely networked civilisation are critical, until it's too late. "When we do the analysis, almost any part is critical if you lose enough of it," says Bar-Yam. "Now that we can ask questions of such systems in more sophisticated ways, we are discovering that they can be very vulnerable. That means civilisation is very vulnerable." So what can we do? "The key issue is really whether we respond successfully in the face of the new vulnerabilities we have," Bar-Yam says. That means making sure our "global sheep" does not get injured in the first place - something that may be hard to guarantee as the climate shifts and the world's fuel and mineral resources dwindle. Tightly coupled system Scientists in other fields are also warning that complex systems are prone to collapse. Similar ideas have emerged from the study of natural cycles in ecosystems, based on the work of ecologist Buzz Holling, now at the University of Florida, Gainesville. Some ecosystems become steadily more complex over time: as a patch of new forest grows and matures, specialist species may replace more generalist species, biomass builds up and the trees, beetles and bacteria form an increasingly rigid and ever more tightly coupled system. "It becomes an extremely efficient system for remaining constant in the face of the normal range of conditions," says Homer-Dixon. But unusual conditions - an insect outbreak, fire or drought - can trigger dramatic changes as the impact cascades through the system. The end result may be the collapse of the old ecosystem and its replacement by a newer, simpler one. Globalisation is resulting in the same tight coupling and fine-tuning of our systems to a narrow range of conditions, he says. Redundancy is being systematically eliminated as companies maximise profits. Some products are produced by only one factory worldwide. Financially, it makes sense, as mass production maximises efficiency. Unfortunately, it also minimises resilience. "We need to be more selective about increasing the connectivity and speed of our critical systems," says Homer-Dixon. "Sometimes the costs outweigh the benefits." Is there an alternative? Could we heed these warnings and start carefully climbing back down the complexity ladder? Tainter knows of only one civilisation that managed to decline but not fall. "After the Byzantine empire lost most of its territory to the Arabs, they simplified their entire society. Cities mostly disappeared, literacy and numeracy declined, their economy became less monetised, and they switched from professional army to peasant militia." Staving off collapse Pulling off the same trick will be harder for our more advanced society. Nevertheless, Homer-Dixon thinks we should be taking action now. "First, we need to encourage distributed and decentralised production of vital goods like energy and food," he says. "Second, we need to remember that slack isn't always waste. A manufacturing company with a large inventory may lose some money on warehousing, but it can keep running even if its suppliers are temporarily out of action." The electricity industry in the US has already started identifying hubs in the grid with no redundancy available and is putting some back in, Homer-Dixon points out. Governments could encourage other sectors to follow suit. The trouble is that in a world of fierce competition, private companies will always increase efficiency unless governments subsidise inefficiency in the public interest. Homer-Dixon doubts we can stave off collapse completely. He points to what he calls "tectonic" stresses that will shove our rigid, tightly coupled system outside the range of conditions it is becoming ever more finely tuned to. These include population growth, the growing divide between the world's rich and poor, financial instability, weapons proliferation, disappearing forests and fisheries, and climate change. In imposing new complex solutions we will run into the problem of diminishing returns - just as we are running out of cheap and plentiful energy. "This is the fundamental challenge humankind faces. We need to allow for the healthy breakdown in natural function in our societies in a way that doesn't produce catastrophic collapse, but instead leads to healthy renewal," Homer-Dixon says. This is what happens in forests, which are a patchy mix of old growth and newer areas created by disease or fire. If the ecosystem in one patch collapses, it is recolonised and renewed by younger forest elsewhere. We must allow partial breakdown here and there, followed by renewal, he says, rather than trying so hard to avert breakdown by increasing complexity that any resulting crisis is actually worse. Lester Brown thinks we are fast running out of time. "The world can no longer afford to waste a day. We need a Great Mobilisation, as we had in wartime," he says. "There has been tremendous progress in just the past few years. For the first time, I am starting to see how an alternative economy might emerge. But it's now a race between tipping points - which will come first, a switch to sustainable technology, or collapse?" Tainter is not convinced that even new technology will save civilisation in the long run. "I sometimes think of this as a 'faith-based' approach to the future," he says. Even a society reinvigorated by cheap new energy sources will eventually face the problem of diminishing returns once more. Innovation itself might be subject to diminishing returns, or perhaps absolute limits. Studies of the way by Luis Bettencourt of the Los Alamos National Laboratory, New Mexico, support this idea. His team's work suggests that an ever-faster rate of innovation is required to keep cities growing and prevent stagnation or collapse, and in the long run this cannot be sustainable.

#### Advanced computer models – results robust with optimistic variables

Debora MacKenzie, a consultant for New Scientist, 1-10-2012, “Boom And Doom: Revisiting Prophecies Of Collapse,” New Scientist, www.countercurrents.org/mackenzie100112.htm

The first thing you might ask is, why look back at a model devised in the days when computers were bigger than your fridge but less powerful than your phone? Surely we now have far more advanced models? In fact, in many ways we have yet to improve on World3, the relatively simple model on which Limits was based. “When you think of the change in both scientific and computational capabilities since 1972, it is astounding there has been so little effort to improve upon their work,” says Yaneer Bar-Yam, head of the New England Complex Systems Institute in Cambridge, Massachusetts. It hasn’t happened in part because of the storm of controversy the book provoked. “Researchers lost their appetite for global modelling,” says Robert Hoffman of company Whatlf Technologies in Ottawa, Canada, which models resources for companies and governments. “Now, with peak oil, climate change and the failure of conventional economics, there is a renewed interest.” The other problem is that as models get bigger, it becomes harder to see why they produce certain outcomes and whether they are too sensitive to particular inputs, especially with complex systems. Thomas Homer-Dixon of the University of Waterloo in Ontario, Canada, who studies global systems and has used WorId3, thinks it may have been the best possible compromise between over-simplification and unmanageable complexity. But Hoffman and Bar-Yam’s groups are now trying to do better. World3 was developed at the Massachusetts Institute of Technology. The team took what was known about the global population, industry and resources from 1900 to 1972 and used it to develop a set of equations describing how these parameters affected each other. Based on various adjustable assumptions, such as the amount of non-renewable resources, the model projected what would happen over the next century. The team compares their work to exploring what happens to a ball thrown upwards. World3 was meant to reveal the general behaviour that results – in the case of a ball, going up and then falling down – not to make precise predictions, such as exactly how high the ball would go, or where and when it would fall. “None of these computer outputs is a prediction,” the book warned repeatedly. Assuming that business continued as usual, World3 projected that population and industry would grow exponentially at first. Eventually, however, growth would begin to slow and would soon stop altogether as resources grew scarce, pollution soared and food became limited. “The Limits to Growth said that the human ecological footprint cannot continue to grow indefinitely, because planet Earth is physically limited,” says Jørgen Randers of the Norwegian School of Management in Oslo, one of the book’s original authors. What’s more, instead of stabilising at the peak levels, or oscillating around them, in almost all model runs population and industry go into a sharp decline once they peak. “If present growth trends in world population, industrialisation, pollution, food production and resource depletion continue unchanged, the limits to growth on this planet will be reached sometime within the next 100 years. The most probable result will be a sudden and rather uncontrollable decline in both population and industrial capacity,” the book warned. This was unexpected and shocking. Why should the world’s economy collapse rather than stabilise? In World3, it happened because of the complex feedbacks between different global subsystems such as industry, health and agriculture. More industrial output meant more money to spend on agriculture and healthcare, but also more pollution, which could damage health and food production. And most importantly, says Randers, in the real world there are delays before limits are understood, institutions act or remedies take effect. These delayed responses were programmed into World3. The model crashed because its hypothetical people did not respond to the mounting problems before underlying support systems, such as farmland and ecosystems, had been damaged. Instead, they carried on consuming and polluting past the point the model world could sustain. The result was what economists call a bubble and Limits called overshoot. The impact of these response delays was “the fundamental scientific message” of the study, says Randers. Critics, and even fans of the study, he says, didn’t get this point. The other message missed was not that humanity was doomed, but that catastrophe could be averted. In model runs where growth of population and industry were constrained, growth did level out rather than collapse – the stabilised scenario (see graph, right inset). Yet few saw it this way. Instead, the book came under fire from all sides. Scientists didn’t like Limits because the authors, anxious to publicise their findings, put it out before it was peer reviewed. The political right rejected its warning about the dangers of growth. The left rejected it for betraying the aspirations of workers. The Catholic church rejected its plea for birth control. Critical points The most strident criticisms came from economists, who claimed Limits underestimated the power of the technological fixes humans would surely invent. As resources ran low, for instance, we would discover more or develop alternatives. Yet the Limits team had tested this. In some runs, they gave World3 unlimited, non-polluting nuclear energy – which allowed extensive substitution and recycling of limited materials – and a doubling in the reserves of nonrenewables that could be economically exploited. All the same, the population crashed when industrial pollution soared. Then fourfold pollution reductions were added as well: this time, the crash came when there was no more farmland. Adding in higher farm yields and better birth control helped in this case. But then soil erosion and pollution struck, driven by the continuing rise of industry. Whatever the researchers did to eke out resources or stave off pollution, exponential growth was simply prolonged, until it eventually swamped the remedies. Only when the growth of population and industry were constrained, and all the technological fixes applied, did it stabilise in relative prosperity. The crucial point is that overshoot and collapse usually happened sooner or later in World3 even if very optimistic assumptions were made about, say, oil reserves. “The general behaviour of overshoot and collapse persists, even when large changes to numerous parameters are made,” says Graham Turner of the CSIRO Ecosystem Sciences lab in Crace, Australia.

#### K wave coming by 2025

Christopher Chase-Dunn , Director of the Institute for Research on World-Systems, University of California-Riverside, and Bruce Podobnik , Assistant Professor in the Department of Sociology and Anthropology at Lewisand Clark College, 1999 , in The Future of Global Conflict, ed. Bornschier and Chase-Dunn, p. 43

While the onset of a period of hegemonic rivalry is in itself disturbing, the picture becomes even grimmer when theinfluence of long-terni economic cycles is taken into account. As an extensive body of research documents (seeespecially Van Duijn, 1983), the 50 to 60 year business cycle known as the Kondratieff wave (K-wave) has been insynchronous operation on an international scale for at least the last two centuries. Utilizing data gathering by Levy(1983) on war severity, Goldstein (1988) demonstrates that there is a corresponding 50 to 60 year cycle in the numberof battle deaths per year for the period 1495-1975. Beyond merely showing that the K-wave and the war cycle arelinked in a systematic fashion, Goldstein’s research suggests that severe core wars are much more likely to occur latein the upswing phase of the K-wave. This finding is interpreted as showing that, while states always desire to go towar, they can afford to do so only when economic growth is providing them with sufficient resources. Modelski andThompson (1996) present a more complex interpretation of the systemic relationship between economic and warcycles, but it closely resembles Goldstein’s hypothesis. In their analysis, a first economic upswing generates theeconomic resources required by an ascending core state to make a bid for hegemony; a second period of economicgrowth follows a period of global war and the establishment of a new period of hegemony. Here, again, specificeconomic upswings are associated with an increased likelihood of the outbreak of core war. It is widely accepted that the current K-wave, which entered a downturn around 1967-73, is probably now in the process of beginning a newupturn which will reach its apex around 2025.

### Collapse Inevitable

#### Growth can only continue through increased complexity – ends system resiliency ensuring catastrophic collapses – collapse now better than later

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So breakdown is a vital part of adaptation, an idea that’s by no means foreign to us. As you know, Joseph Schumpeter, the great Austrian economist of the middle 20th century, introduced the idea of “creative destruction.” He argued that modern capitalist economies are extraordinarily innovative precisely because their components constantly go through cycles of breakdown and rejuvenation. When a firm goes bankrupt, its resources, including its human and financial capital, are liberated and reorganized within the economy, aiding the economy’s overall adaptation. But while we might accept this idea – more or less – within modern capitalist economies, we haven’t accepted it at all within our social or political systems. Instead, when it comes to our societies and political processes, we try to extend the front loop indefinitely; we try to make sure breakdown never happens. Holling and his colleagues say that such practices simply increase the probability of an even more serious crisis – a more catastrophic breakdown – in the future. In working with the idea of the adaptive cycle, I have concluded that it’s important to add an amendment to Holling’s general idea: as a system moves up the front loop, stresses of various forms build. These stresses accumulate because the system learns to displace a lot of its problems to its external environment – quite simply, it pushes them beyond its boundaries. The system might become increasingly competent at managing everything within its loose boundaries, but it pushes away things it can’t manage well. Humankind has done something like this with the consequences of its massive energy consumption: we have pushed untold quantities of carbon dioxide into the larger climate system. Now this perturbation of Earth’s climate is rebounding to stress our economies and societies. The same type of phenomenon is visible in our national and global economies: as these economies have grown in recent decades, they have accumulated enormous debts to sustain demand and employment. These debts have essentially externalized to the future the present costs of consumption. Once again, though, the chickens have come home to roost: accumulating debt has recently become a huge stress – in the present – on our economies and societies. So, while everything may seem to be relatively stable as a system moves up the front loop of the adaptive cycle, underlying stresses – what I’ve come to call “tectonic stresses” – are often worsening. Causes of declining resilience in complex adaptive systems And why does resilience fall as a system approaches the top of the front loop? It appears that three phenomena common to all complex systems are at work. The first is a steady loss of capacity to exploit the system’s potential for novelty. A climax forest, for instance, has clusters of species (often including very large organisms) that absorb the majority of matter and energy coming into the forest from the external environment. As a result, very little residual matter and energy is available to support the expression of other possibilities – to support the expression of novelty. Many of the mutations that might have slowly accumulated within the forest’s genetic information don’t have a chance to express themselves. Canadian society today offers an interesting analogue: health care. This component of our social and economic system is gobbling up an ever-larger fraction of our total resources, leaving fewer resources to support experimentation, creativity, and novelty elsewhere in our society. The second cause of falling resilience is the declining redundancy of critical components. As a forest approaches its climax stage, redundant components are pruned away. Early in the front loop, a forest might have, say, a dozen nitrogen fixing species, each of which takes nitrogen out of the atmosphere and converts it into a form usable by plants. At its climax stage (at the top of the front loop), the forest has likely pruned away much of this redundancy, so that it has only one or two nitrogen fixers left. As a result, it becomes vulnerable to loss of those particular species and, potentially, susceptible to collapse. The similarity to processes in our world economy is striking, although the data are somewhat anecdotal. As the world economy has become more integrated, we have seen a steady concentration of production in a relatively small number of firms – analogues of a forest’s nitrogen fixers. Two companies make all large jet liners, three companies make all jet engines, four companies make 95 percent of the world’s microprocessors, three companies sell 60 percent of all tires, two manufacturers press 66 percent of the world’s glass bottles, and one company in Germany produces the machines that make 80 percent of the world’s spark plugs. I think it’s safe to say that redundancy has been pruned from the global economy in the same way that Holling observes in ecological systems. Third and finally, as a system moves up the front loop, rising connectivity increases the risk of cascading failure, which in turns lowers resilience. For these three reasons, resilience eventually falls as complex adaptive systems mature. But in our contemporary world, we have something else happening too. As I’ve already noted this evening, our global economic, social, and technological systems need almost inconceivable amounts of energy to maintain their complexity, and the steady supply of this energy is now in question. Our global systems are under rising stress at the same time they’re moving steadily farther from thermodynamic equilibrium. It’s as if we’re pushing a marble up the side of a bowl: we have to expend steadily more energy to keep the marble up the side of the bowl, and if that energy suddenly isn’t available, the marble will roll back down to the bowl’s bottom, which is equivalent to a dramatic loss of complexity. That’s my brief synopsis of Panarchy Theory. I find the parallel between these ideas and what we’re seeing in our world quite astonishing. I believe Panarchy Theory provides us with tools to understand our situation and think more creatively about the challenges we face. For instance, earlier I remarked that whether we regard complexity as a good or bad thing depends to an extent on the stage of evolution of the system in question. Now I can explain what I meant in more detail. To an entrepreneurial actor dealing with a system early in its front loop of development – a period in which rising potential and connectivity are producing novel combinations and exciting innovations – complexity might look like a good thing. On the other hand, to a manager trying to keep a system running at the top of the front loop with its staggering connectivity and declining resilience, anticipating a breakdown because the system has become critically fragile, complexity might look like a really bad thing. It’s actually quite difficult to say finally, once and for all, whether complexity is good or bad. We have to say that it depends – on the interests of people involved with the system in question and on the system’s stage of evolution. My interpretation of Panarchy Theory also suggests that we can expect significant breakdowns in major global systems. That statement sounds apocalyptic, and I have received a lot of grief over the years for making such statements. But I receive less grief now than I did ten years ago – which is maybe why I am speaking to you now. Effective government in a world of complex adaptive systems At this point, you might ask: In a world of rising complexity, uncertainty, and potential for systemic breakdown, how can we possibly govern? The challenge, I believe, is difficult, but not insurmountable. There are many things we can do to govern our societies and the world more effectively. First of all, we need to be able to identify when we’re dealing with a complex system or problem. I don’t mean to suggest this evening that we should jettison all our previous paradigms of system management. Sometimes thinking of the world as a simple machine – or of a particular problem as the consequence of a system that operates like a simple machine – is entirely appropriate. Sometimes a Newtonian, reductionist, push-pull model of the world should guide our problem solving. But we must learn how to discriminate between simple and complex problems, which means we must have the intuition to recognize complexity when we encounter it. When it comes to dealing with complex systems that are critically important to our well being, one of our first aims should be to increase as much as possible their resilience. As I’ve explained, systems that are low in resilience – that are brittle – are likely to suffer from cascading failure when hit by a shock. Such failures can overwhelm our personal, organizational and societal coping capacity, so that we can’t seize the opportunities for deep and beneficial change that might accompany a shock. Boosting the resilience of our critical complex systems helps ensure that we have enough residual coping capacity to exploit the potential for change offered by crisis.

### Collapse Inevitable

#### Rising complexity required by growth isn’t sustainable – requires exponential increases in energy which aren’t available and destroys system resiliency – collapse later destroys all chances of recovery

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"Why do you feel the world is verging on some kind of systemic crisis?" "There are three reasons," he answered. "First, over the years my understanding of the adaptive cycle has improved, and I've also come to better understand how multiple adaptive cycles can be nested together-from small to large-to create a panarchy. I now believe that this theory tells us something quite general about the way complex systems, not just ecological systems, change over time. And collapse is usually part of the story. "Second, I think rapidly rising connectivity within global systems-both economic and technological-increases the risk of deep collapse. That's a collapse that cascades across adaptive cycles-a kind of pancaking implosion of the entire system as higher-level adaptive cycles collapse, which causes progressive collapse at lower levels." "A bit like the implosion of the World Trade Center towers," I offered, "where the weight of the upper floors smashed through the lower floors like a pile driver." "Yes, but in a highly connected panarchy, the collapse doesn't have to start at the top. It can be triggered at the microlevel or the macrolevel or somewhere in between. It's the tight interlinking of the adaptive cycles across the whole system-from the individual right up to the level of the global economy and even Earth's biosphere-that's particularly dangerous because it increases the likelihood that many of the cycles will become synchronized and peak together. And if this happens, they'll reinforce each other's collapse." "The third reason," he continued, "is the rise of mega-terrorism-the increasing risk of attacks that will kill huge numbers of people and produce major disruptions in world systems. I'm not sure why megaterrorism has become more likely now. I suppose it's partly a result of technological changes and the rise of particularly virulent kinds of fundamentalism. But I do know that in a tightly connected world where vulnerabilities are aligned, such attacks could trigger deep collapse-and that's particularly worrisome. "This is a moment of great volatility and instability in the world system. We need urgently to do what we can to avoid deep collapse. We also need to figure out how to exploit the opportunity provided by crisis and collapse when they occur, because some kind of systemic breakdown is now almost certain." We can see the danger of the tectonic stresses in a new light if we think of humankind-including all our interactions with each other and with nature and all the flows of materials, energy, and information through our societies and technologies-as one immense social-ecological system. As this grand system we've created and live within moves up the growth phase of its adaptive cycle, it's accumulating potential in the form of people's skills and economic wealth. It's also becoming more connected, regulated, and efficient-and ultimately less resilient. And finally, it's becoming steadily more complex, which means it's moving further and further from thermodynamic equilibrium. We need ever-larger inputs of high-quality energy to maintain this complexity. In the meantime, internal tectonic stresses-including worsening scarcity of our best source of high-quality energy, conventional oil-are building slowly but steadily. So we're overextending the growth phase of our global adaptive cycle. We'll reach the top of this cycle when we're no longer able to regulate or control the stresses building deep inside the global system. Then we'll get earthquakelike events that will cause the system's breakdown and simplification as it moves closer to thermodynamic equilibrium. Panarchy theory also helps us better understand another critically important phenomenon: the denial that prevents us from seeing the dangers we face. Our explanations of the world around us-whether of Earth's place in the cosmos or of the workings of our economy-move through their own adaptive cycles. When a favorite explanation encounters contradictory evidence, we make an ad hoc adjustment to it to account for this evidence-just like Ptolemy added epicycles to his explanation of the planets' movements. In the process, our explanation moves through something akin to a growth phase: it becomes progressively more complex, cumbersome, and rigid; it loses resilience; and it's ripe for collapse should another, better, theory come along. We often invest enormous mental energy to maintain a perspective on the world that's at variance with reality-that's far from intellectual equilibrium, so to speak. But today bits of anomalous evidence-from data on the melting of Greenland's ice cap to reports of steadily falling discovery of new oil fields-are piling up around us. Lessons from Rome... For over a millennium in Western culture, Rome's collapse has been an emblem of social catastrophe, one often used as a cudgel in political debate. When people don't approve of a particular social, political, or economic trend, they'll often assert that it caused Rome's demise. So explanations have proliferated. In 1984 the German historian Alexander Demandt listed more than 200 different explanations for Rome's fall that he found in the historical literature since 1600-from epidemics, plutocracy, and the absence of character to vainglory. Perhaps it's rash, then, to add another one to the list. Still, recent work by archaeologists, economic historians, and complexity theorists gives fresh insight into what happened. And their story, which has immense relevance to our situation today, comes down to this. Because energy is a society's master resource, when Rome exhausted its energy subsidies from its conquests-when it had to move, in other words, from high energy-return-on-investment (EROI) sources of energy to low-EROI sources-it faced a critical transition. And, at least in the Western part of the empire, it didn't make this transition successfully. It couldn't sustain the cost and complexity of its far-flung army, ballooning civil service, hungry and restless cities, elaborate information flows, and intricate irrigation systems. Not that it didn't try. Rome's prodigious effort to save itself by putting in place a system to aggressively manage its energy problem was simultaneously one of history's greatest triumphs and tragedies. It was a triumph because, for a while at least, the effort reversed what seemed like the empire's inexorable decline; but it was ultimately a tragedy because it didn't address the empire's underlying problem-complexity too great for a food-based energy system-and was thus bound to fail. The western Roman empire couldn't make the transition from high-EROI to low-EROI sources of energy. Today, our societies are headed toward a similar transition as oil becomes harder to find. Sometime in the 1960s the United States crossed a critical threshold when its EROI for domestic petroleum extraction started to fall, and it's likely that since then just about every other oil-producing region in the world has crossed the same threshold (often it takes a while for data to show clearly that the threshold has been crossed). Very few people-certainly not our society's leaders-grasp the significance of this change, yet it's of epochal importance. It marks the beginning of a shift from our modern industrial civilization to some other kind of civilization. We can't yet say what form this new civilization will take, but we can be fairly certain that compared with our experience over the century and a half since the industrial revolution, energy will become far more costly as nonconventional and renewable sources replace cheap oil. The price rise won't be steady and linear: we'll see sharp spikes and dips as the global economy tries to adjust. Even an average increase in real energy costs of just 2.5 percent each year-a rate we've consistently exceeded in recent years-will compound into a tenfold increase in a century. Can we get through this transition wisely and safely? Not if we refuse to understand its implications and simply continue what we're doing now. In Buzz Holling's terms, we're busily extending the growth phase of the adaptive cycle of our planetary economic, ecological, and social system. In the process, this planetary system is becoming steadily more complex, connected, efficient, and regulated. Eventually it will become less resilient; it may, in fact, have already started to lose resilience. A number of factors drive these changes. First, the desperate need of companies, economies, and societies to maximize performance and productivity forces them to steadily boost their organizational and technological complexity, their internal efficiency and regulation, and their speed of production and transport of materials, energy, and information. Also, as the world economy expands relative to the size of Earth's resource base and biosphere, we have to use resources and energy far more efficiently and manage our interactions with nature with ever greater care-and this means progressively more elaborate technologies, procedures, regulations, and institutions. Based on current trends, global output of goods and services will quadruple from US$60 to $240 trillion (in 2005 dollars) by 2050. If we're going to keep such a gargantuan economy humming-and if we're going to avoid simultaneously wrecking the planet's environment-we'll need everything from high-tech energy and water conservation programs to huge bureaucracies that find and punish the people and companies that emit too much carbon dioxide. And finally, as our EROI declines in coming decades, we'll need far more sophisticated technologies and organizations to scavenge small pockets of oil from all over the world and to pull together lower-quality energy from a myriad of solar, wind, and geothermal generating plants. In short, in coming decades our resource and environmental problems will become progressively harder to solve; our companies, organizations, and societies will therefore have to become steadily more complex to produce good solutions; and the solutions they produce-whether technological or institutional-will have to be more complex too. ...and from Holland Today's Holland gives us a hint of what this future might be like. One of the world's most crowded countries, Holland has a heavily industrialized, energy-intensive, high-consumption economy, and its people must constantly fight back the sea to survive on their small patch of territory-much of it indeed reclaimed from the sea. Over the centuries, the Dutch have responded by putting in place astonishingly complex systems of technology and social regulation. These have included block-by-block urban residential committees to prevent flooding, detailed laws to maximize efficient use of land, and of course an intricate system of dikes, canals, and pumping stations. As Holland has become progressively wealthier, more crowded, and more hemmed in by resource and environmental pressures, the regulations and technologies have become steadily more intricate and costly. But if we end up with a global society and economy like Holland's, would that really be so bad? After all, the Dutch live very well. Sadly, even the enormous complexity of today's Holland won't be remotely adequate for the host of planetary challenges we're going to have to address soon, like climate change and worsening shortages of high-quality energy. We'll have to create a global society that I've come to call "Holland times 10," with vastly more sophisticated, pervasive, and expensive rules and regulatory institutions than anything the Dutch live with today. Do we really want such a future for ourselves and our children? And even if we do, can we really create it? First of all, Holland is in some ways an inadequate example. It's a small, ethnically homogeneous society with relatively low economic inequality, a deeply rooted culture of collaboration, and a citizenry that's receptive to social policies intended to change people's behaviors. These are hardly features of our world as a whole. Also, today's Holland maintains its comfortable lifestyle by importing energy, food, and natural resources from far beyond its boundaries, and by expelling much of its wastes, such as its carbon dioxide, outside its boundaries too-Holland's carbon dioxide ends up traveling in the atmosphere around the planet. Humanity as a whole, though, can't get its resources or expel its pollution beyond Earth's boundaries. More important, as our global social-ecological system moves through the growth phase of its adaptive cycle-toward a Holland-times-10 future-it's losing resilience. Capitalism's constant pressure on companies to maximize efficiency tightens links between producers and suppliers; reduces slack, buffering, and redundancy; and so makes cascading failures more likely and damaging. As well, capitalism's pressure on people to be more productive and efficient drives them to acquire hyperspecialized skills and knowledge, which means they become less autonomous, more dependent on other specialized people and technologies, and ultimately more vulnerable to shocks (remember how most Americans were so ill equipped to deal with the 2003 blackout). Meanwhile, worsening damage to the local and regional natural environment in many poor countries is fraying ecological networks and undermining economies and political stability. And finally pressure is increasing within both rich and poor societies too-from tectonic stresses like demographic imbalance, growth of megacities, and widening income gaps. All these factors are creating an overload condition just at the moment when we're entering an epochal shift from high-EROI to low-EROI sources of energy. Because it takes energy to create and maintain complexity and order, and because energy will become steadily more expensive, we'll find it steadily harder to implement complex solutions to our complex problems. Indeed, in a world of far higher energy costs, a Holland-times-10 global system is likely impossible. Even today's globalized economy won't be viable, because it takes too much energy to keep it running. As energy prices rise, we'll first see cutbacks on long-distance travel and trade. Instead of becoming increasingly "flat" as barriers to commerce and economic integration disappear-as some commentators, such as the New York Times columnist Thomas Friedman, suggest-the world will become more regionalized and even hierarchical because manufacturing, commerce, and political power will shift to countries with relatively good access to energy. Eventually those of us in rich countries will have to change many things in our societies and daily lives-not just the machines we use to produce and consume energy but also the work we do, our entertainment and leisure activities, how much we travel in cars and airplanes, our financial systems, the design of our cities, and the ways we produce our food (because our current agricultural practices consume a huge amount of energy). The growth phase we're in may seem like a natural and permanent state of affairs-and our world's rising complexity, connectedness, efficiency, and regulation may seem relentless and unstoppable-but ultimately it isn't sustainable. Still, we find it impossible to get off this upward escalator because our chronic state of denial about the seriousness of our situation-aided and abetted by powerful special interests that benefit from the status quo-keeps us from really seeing what's happening or really considering other paths our world might follow. Radically different futures are beyond imagining. So we stay trapped on a path that takes us toward major breakdown. The longer a system is "locked in" to its growth phase, says Buzz Holling, "the greater its vulnerability and the bigger and more dramatic its collapse will be." If the growth phase goes on for too long, "deep collapse"-something like synchronous failure-eventually occurs. Collapse in this case is so catastrophic and cascades across so many physical and social boundaries that the system's ability to regenerate itself is lost. [A] forest-fire shows how this happens: if too much tinder-dry debris has accumulated, the fire becomes too hot, which destroys the seeds that could be the source of the forest's rebirth.

### Collapse Inevitable

#### No chance of realignment – growth is sustained by excessive risk causing spiraling costs and state default

Immanuel Wallerstein, senior research scholar at Yale University, January/February 2011, “Unconventional Wisdom: THE GLOBAL ECONOMY WON'T RECOVER, NOW OR EVER,” Foreign Policy, http://www.foreignpolicy.com/articles/2011/01/02/unconventional\_wisdom?page=0,9

But it is wrong. All systems have lives. When their processes move too far from equilibrium, they fluctuate chaotically and bifurcate. Our existing system, what I call a capitalist world-economy, has been in existence for some 500 years and has for at least a century encompassed the entire globe. It has functioned remarkably well. But like all systems, it has moved steadily further and further from equilibrium. For a while now, it has moved too far from equilibrium, such that it is today in structural crisis. The problem is that the basic costs of all production have risen remarkably. There are the personnel expenses of all kinds -- for unskilled workers, for cadres, for top-level management. There are the costs incurred as producers pass on the costs of their production to the rest of us -- for detoxification, for renewal of resources, for infrastructure. And the democratization of the world has led to demands for more and more education, more and more health provisions, and more and more guarantees of lifetime income. To meet these demands, there has been a significant increase in taxation of all kinds. Together, these costs have risen beyond the point that permits serious capital accumulation. Why not then simply raise prices? Because there are limits beyond which one cannot push their level. It is called the elasticity of demand. The result is a growing profit squeeze, which is reaching a point where the game is not worth the candle. What we are witnessing as a result is chaotic fluctuations of all kinds -- economic, political, sociocultural. These fluctuations cannot easily be controlled by public policy. The result is ever greater uncertainty about all kinds of short-term decision-making, as well as frantic realignments of every variety. Doubt feeds on itself as we search for ways out of the menacing uncertainty posed by terrorism, climate change, pandemics, and nuclear proliferation. The only sure thing is that the present system cannot continue. The fundamental political struggle is over what kind of system will replace capitalism, not whether it should survive. The choice is between a new system that replicates some of the present system's essential features of hierarchy and polarization and one that is relatively democratic and egalitarian. The extraordinary expansion of the world-economy in the postwar years (more or less 1945 to 1970) has been followed by a long period of economic stagnation in which the basic source of gain has been rank speculation sustained by successive indebtednesses. The latest financial crisis didn't bring down this system; it merely exposed it as hollow. Our recent "difficulties" are merely the next-to-last bubble in a process of boom and bust the world-system has been undergoing since around 1970. The last bubble will be state indebtednesses, including in the so-called emerging economies, leading to bankruptcies.

### Collapse Inevitable

#### Collapse is inevitable – resources, food, warming, and population

Ted Trainer, Visiting Fellow in the Faculty of Arts at the University of NSW, senior lecturer in sociology, 4-20-2007, “We can't go on living like this,” Online Opinion, http://www.onlineopinion.com.au/view.asp?article=5754&page=0

The fundamental cause of the big global problems threatening us now is simply over-consumption. The rate at which we in rich countries are using up resources is grossly unsustainable. It’s far beyond levels that can be kept up for long or that could be spread to all people. Yet most people totally fail to grasp the magnitude of the over-shoot. The reductions required are so big that they cannot be achieved within a consumer-capitalist society. Huge and extremely radical change to very systems and culture are necessary. Advertisement Several lines of argument lead to this conclusion, but I’ll note only three. Some resources are already alarmingly scarce, including water, land, fish and especially petroleum. Some geologists think petroleum supply will peak within a decade. If all the world’s people today were to consume resources at the per capita rate we in rich countries do, the annual supply rate would have to be more than six times as great as at present, and if the population of 9 billion we will have on earth soon were to do so it would have to be about ten times as great. Second, the per capita area of productive land needed to supply one Australian with food, water, settlements and energy, is about 7-8 ha. The US figure is closer to 12 ha. But the average per capita area of productive land available on the planet is only about 1.3 ha. When the world population reaches 9 billion the per capita area of productive land available will be only 0.8 ha. In other words in a world where resources were shared equally we would all have to get by on about 10 per cent of the present average Australian footprint. Third, the greenhouse problem is the most powerful and alarming illustration of the overshoot. The scientists are telling us that if we are to stop the carbon dioxide content of the atmosphere from reaching twice the pre-industrial level we must cut global carbon emissions, and thus fossil fuel use, by 60 per cent in the short term, and more later. If we cut it 60 per cent and shared the remaining energy among 9 billion people each Australian would have to get by on less than 5 per cent of the fossil fuel now used. And that target, a doubling of atmospheric CO2, is much too high to be safe. We’re now 30 per cent above pre-industrial levels and already seeing disturbing climatic effects. These lines of argument show we must face up to enormous reductions in rich world resource use, perhaps by 90 per cent, if we’re to solve the big global problems. This is not possible in a society that’s committed to the affluent lifestyles that require high energy and resource use. Advertisement Now all that only makes clear that the present situation is grossly unsustainable. But this society is fundamentally and fiercely obsessed with raising levels of production and consumption all the time, as fast as possible, and without any limit. In other words our supreme, sacred, never-questioned goal is economic growth. We’re already at impossible levels of production and consumption but our top priority is to go on increasing them all the time. If we in Australia average 3 per cent growth to 2070 and by then the 9 billion people expected on earth have all risen to the living standards we would then have, total world economic output each year would be 60 times as great as it is now. Yet the present level is grossly unsustainable. The foregoing comment has only been about ecological and resource sustainability and our society is also built on a second deeply flawed foundation. We have an extremely unjust global economy. It’s a market economy and that means scarce things go to those who can pay most for them, which means, to the rich and not to the poor. So the few in rich countries gobble up most of the world’s resource production. Even more important, in a market economy what’s developed is what’s most profitable not what most needed. So the development that takes place in the Third World is development of what will maximise the profits of corporations. Look at any Third World country and you see a lot of development but most of it is putting their resources into producing to stock our rich world supermarkets, and little or none goes into the industries that will produce the basic necessities the majority of poor people need. Conventional development is therefore well described as a process of plunder. Rich countries go to a lot of trouble to maintain a global economy that works in their interests, including using aid, Structural Adjustment Packages, arms sales, support for friendly dictators, and outright invasion. Our living standard in countries like Australia could not be anywhere near as high as it is if these processes did not occur and we had to get by on our fair share of the world’s resources. What then is the answer? If the question is: how can we run a sustainable and just consumer-capitalist society? the point is that there isn’t any answer. That cannot be done.

### Collapse Inevitable – AT: Tricky Econ

#### Reject optimistic assessments – over prioritize the short term, are paid off by special interests, and empirically make faulty predictions

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Yes, everything you know about economics is wrong. Dead wrong. Everything. The conclusions of economists are based on a fiction that distorts everything else. As a result economics is as real as one of the summer blockbusters like “Battleship,” “The Avenger” or “Prometheus.” The difference is that the economic profession is a genuine threat, not entertainment. Economics dogma is on track to destroy the world with a misleading ideology. Why? Because all economics is based on the absurd Myth of Perpetual Growth. Yes, all theories and business plans based on growth are mythological. Economists are master illusionists who rely on a set of fictions, fantasies and forecasts that emanate from a core magical mantra of Perpetual Growth that goes untested year after year. And yet it’s used to manipulate the public into a set of policies and decisions that are leading the American and the world economy down a path of unsustainable globalization and GDP growth assumptions that will self-destruct the planet. Denial? We’re all addicted to the Myth of Perpetual Growth Yes, economists are addicted to this ideology. Trapped deep in their denial, can’t see the problem, or admit it, or if they do, they are unable to stop themselves, see past their own myopic world view. They’re mercenaries working for capitalists who pay their salaries, and expect them to support the capitalist’s bizarre Myth of Perpetual Growth. Worse, the public also bought into the myth. Yes, you believe everything you learned in college about economic theories, all the textbooks, everything you read in the daily press, the government reports, all those Wall Street analysts’ predictions relying on studies prepared by economists with credentials. But everything you think you know about economics … is wrong. Dead wrong. And until economics acknowledge this, the discipline is on a self-destruct path. Why? The science of economics is not science. Yes, it looks scientific with all the fancy math algorithms and computer models that economists use, but all that’s just window dressing to make the economist look scientific and rational. They’re not. Their conclusions are pre-ordained, fabricated, based on their biases, personal ideologies and whatever their employer wants to prove to manipulate consumers, voters or investors to buy what they’re selling. ‘What do you call an economist with a prediction? Wrong’ Don’t believe me? Go look at USA Today’s quarterly surveys of 50 economists projections of GDP growth. Invariably off by a large margin. And Barron’s Big Money poll? In past reviews we’ve seen a wide gap in forecasts by the bulls and bears. Bottom line: Whether it’s Roubini or Roach, Kudlow or Krugman, you can’t trust the predictions of any economist. Ever. Best warning: That famous BusinessWeek editorial several years ago headlined: “What Do You Call an Economist with a Prediction? Wrong.” Unfortunately, we live in a world of capitalists who thrive on the great Myth of Perpetual Growth, endless growth, ad infinitum, forever, till the end of time. But driving the economists’ growth myth is population growth. It’s the independent variable in their equation. Population growth drives all other derivative projections, forecasts and predictions. All GDP growth, income growth, wealth growth, production growth, everything. These unscientific growth assumptions fit into the overall left-brain, logical, mind-set of western leaders, all the corporate CEOs, Wall Street bankers and government leaders who run America and the world. But just because a large group collectively believes in something doesn’t make it true. Perpetual growth is still a myth no matter how many economists, CEOs, bankers and politicians believe it. It’s still an illusion trapped in the brains of all these irrational, biased and uncritical folks. No-win scenario: Damned if we grow? Damned it we don’t grow? Capitalism itself is at a crossroads. Growth is capitalism’s sacred cow but it’s “grow or die” theory doesn’t work anymore. With us since 1776, it’s being challenged by a “new god of reality” that’s flashing warnings of an emerging new reality from critics, contrarians and eco-economists. This war is pitting old and new economists: Grow OR Die. Traditional economists (pro-capitalism): We’re told we need 3% GDP growth to support the next batch of 100 million Americans. We believe it on faith. Drill Baby Drill. Buy stuff. Get new jobs to fuel growth. We’re out of control. Exploding growth fuels demands as the rest of the world adds 2.9 billion new humans, all chasing their “American dream.” Grow AND Die. New eco-economists (environmentalists): They see Big Oil’s destruction of our coastal economies, the rape of West Virginia’s coal mountains, the unintended consequences of uncontrolled carbon emissions and they ask: “When will economists, politicians and corporate leaders stop pretending Earth’s resources are infinitely renewable?” Yes, our world is at a crossroads, facing a dilemma, confronting the ultimate no-win scenario, because the “Myth of Perpetual Growth” is essential to support the global population explosion. But all this “Growth” is also killing our world, wasting our planet’s non-renewable natural resources. “Eternal Growth” is suicidal, will eventually destroy Earth. We’re damned if we grow. Damned if we don’t. But will economists change as long as they’re mercenaries in the employ of Perpetual Growth Capitalists? No. It will take a new mind-set. The difference between the mind-set of traditional economists and the new eco-economists is simple: Traditional economists think short-term, react short-term, pursue short-term goals. New eco-economists think long-term. Initially this may seem overly simplistic, but fits perfectly. Here’s why: Old traditional economists — short-term thinkers: Traditional economists are employees and consultants for organizations with short-term views — banks, big corporations, institutional investors, think-tanks, government. They all think in lock-step, driven by daily returns, quarterly earnings, annual bonuses. Short business and election cycles are more important than what happens a decade in the future. Their brains are convinced: If we can’t survive the short, long-term is irrelevant. Environmental economists — long-term thinkers: New eco-economists see, think and plan for the long-term. They know traditional economists’ and capitalists’ thinking is setting America up for more and bigger catastrophes than the Gulf oil spill and the last meltdown. The “Avatar” film is a perfect metaphor: Soon capitalism will exhaust Earth’s resources forcing us to invade distant planets searching for new energy resources. Actually something more immediate will force change much sooner. You are not going to like it: United Nations and Pentagon studies predict population growth (the main driver of all economic growth) will create unsustainable natural-resources demands as early as 2020 with global population exploding from seven to 10 billion by 2050. So expect Depression Era austerity, unemployment and a new no-growth economy.

### Collapse Inevitable – AT: Tech

#### Extremely low probability technology will beat current unsustainable trends

Alan Atkisson, former executive editor of In Context: A Quarterly of Humane Sustainable Culture, 3-20-2003, “Sustainability is Dead— Long Live Sustainability”,

Change is clearly possible. Modest changes in the direction of greater sustainability are now underway, and modest, incremental changes in both technology and habitual practice can ameliorate—indeed, have ameliorated—some dangerous trends in the short run. But overall, incremental change of this sort has proven exceedingly slow and difficult to effect, and most incremental change efforts fall far short of what is needed. Carbon emissions, which are now causing visible climate change, provide a good example: current global agreements for modest reductions are hard to reach, impossible to enforce, and virtually without effect; and even if they were successful, they would have a negligible impact on the critical trend. Far more dramatic changes are required. Dramatic, rapid change, in the form of extremely accelerated innovation in the Noösphere (conscious awareness and understanding) and the Technosphere (physical practice) is necessary both to prevent continuing and ever more catastrophic damage to the Biosphere, and to adapt to those irreversible changes to which the planet is already committed, such as some amount of climatic instability. The rapid evolution of many social, economic, and political institutions, which mediate between the Noösphere and the Technosphere, is obviously necessary as well. Without extraordinary and dramatic change, the most probable outcome of industrial civilization's current trajectory is convulsion and collapse. “Collapse” refers not to a sudden or apocalyptic ending, but to a process of accelerating social, economic, and ecological decay over the course of a generation or two, punctuated by ever-worsening episodes of crisis. The results would likely be devastating, in both human and ecological terms. The onset of collapse is probably not ahead of us in time, but behind us: in some places, such as storm-ravaged Orissa, Honduras, Bangladesh, Venezuela, even England and France, collapse-related entropy may already be apparent. Trend, of course, is probability, not destiny. It is still theoretically possible, albeit very unlikely, that civilization could continue straight ahead, without any conscious effort to direct technological development and the actions of markets in more environmentally benign and culturally constructive ways, and escape collapse through an unexpected (though currently unimaginable) technological breakthrough or improbable set of events. Some have called this the “Miracle Scenario.” But hoping for a miracle is by far the riskiest choice. The future may be fundamentally unknowable, but certain physical processes are predictable, given adequate knowledge about current trends, causal linkages, and systemic effects. Prediction based on extrapolation is not just the province of physics: much of our economy is focused on efforts to accurately predict the future based on past trends. The Internet economy, for example, relies upon Moore’s Law (that the speed and capacity of semiconductor chips doubles roughly every 18 months). Insurance companies base their entire portfolio of investments and fees on statistical assessments of past disasters and projected trends into the future. When it comes to the prospects for sustaining our civilization, we have to trust our species’ best judgment, which comes from the interpretations and extrapolations of our best experts. These experts—such as the respected Intergovernmental Panel on Climate Change—are reporting a disturbingly high degree of consensus about the level of threat to our future well-being. We are in trouble.

### Collapse Inevitable – AT: Market Solves

#### Market mechanisms geared around growth create system wide instability – incentivizes reckless short-term logic – financial crisis proves

Tim Jackson, Prof of Econ at University of Surrey, 3-30-2009, “Prosperity without Growth,” Sustainable Development Commission, http://www.sd-commission.org.uk/data/files/publications/pwg\_summary\_eng.pdf

Growth has delivered its benefits, at best, unequally. A fifth of the world’s population earns just 2% of global income. Inequality is higher in the OECD nations than it was 20 years ago. And while the rich got richer, middle-class incomes in Western countries were stagnant in real terms long before the recession. Far from raising the living standard for those who most needed it, growth let much of the world’s population down. Wealth trickled up to the lucky few. Fairness (or the lack of it) is just one of several reasons to question the conventional formula for achieving prosperity. As the economy expands, so do the resource implications associated with it. These impacts are already unsustainable. In the last quarter of a century the global economy has doubled, while an estimated 60% of the world’s ecosystems have been degraded. Global carbon emissions have risen by 40% since 1990 (the Kyoto Protocol ‘base year’). Significant scarcity in key resources – such as oil – may be less than a decade away. A world in which things simply go on as usual is already inconceivable. But what about a world in which nine billion people all aspire to the level of affluence achieved in the OECD nations? Such an economy would need to be 15 times the size of this one by 2050 and 40 times bigger by the end of the century. What does such an economy look like? What does it run on? Does it really offer a credible vision for a shared and lasting prosperity? These are some of the questions that prompted this report. They belong in a long tradition of serious reflection on the nature of progress. But they also reflect real and immediate concerns. Climate change, fuel security, collapsing biodiversity and global inequality have moved inexorably to the forefront of the international policy agenda over the last decade. These are issues that can no longer be relegated to the next generation or the next electoral cycle. They demand attention now. Accordingly, this report sets out a critical examination of the relationship between prosperity and growth. It acknowledges at the outset that poorer nations stand in urgent need of economic development. But it also questions whether ever-rising incomes for the already-rich are an appropriate goal for policy in a world constrained by ecological limits. Its aim is not just to analyse the dynamics of an emerging ecological crisis that is likely to dwarf the existing economic crisis. But also to put forward coherent policy proposals (Box 1) that will facilitate the transition to a sustainable economy. In short, this report challenges the assumption of continued economic expansion in rich countries and asks: is it possible to achieve prosperity without growth? Recession throws this question into sharp relief. The banking crisis of 2008 led the world to the brink of financial disaster and shook the dominant economic model to its foundations. It redefined the boundaries between market and state and forced us to confront our inability to manage the financial sustainability – let alone the ecological sustainability – of the global economy. This may seem an inopportune moment to question growth. It is not. On the contrary, this crisis offers the potential to engage in serious reflection. It is a unique opportunity to address financial and ecological sustainability together. And as this report argues, the two things are intimately related. Chapter 2 argues that the current turmoil is not the result of isolated malpractice or simple failures of vigilance. The market was not undone by rogue individuals or the turning of a blind eye by incompetent regulators. It was undone by growth itself. The growth imperative has shaped the architecture of the modern economy. It motivated the freedoms granted to the financial sector. It stood at least partly responsible for the loosening of regulations and the proliferation of unstable financial derivatives. Continued expansion of credit was deliberately courted as an essential mechanism to stimulate consumption growth. Economic growth is supposed to deliver prosperity. Higher incomes should mean better choices, richer lives, an improved quality of life for us all. That at least is the conventional wisdom. But things haven’t always turned out that way. This model was always unstable ecologically. It has now proven itself unstable economically. The age of irresponsibility is not about casual oversight or individual greed. If there was irresponsibility it was systematic, sanctioned widely and with one clear aim in mind: the continuation and protection of economic growth. The failure of this strategy is disastrous in all sorts of ways. Not least for the impacts that it is having across the world, in particular in poorer communities. But the idea that growth can deliver us from the crisis is also deeply problematic. Responses which aim to restore the status quo, even if they succeed in the short term, simply return us to a condition of financial and ecological unsustainability.

### Collapse Inevitable – AT: System Reform

#### There’s nothing that can stop the collapse

Ted Trainer, Visiting Fellow in the Faculty of Arts at the University of NSW, senior lecturer in sociology, June 2010, “The Problems of Climate Change Cannot Be Solved By Consumer Societies”, http://journalofcosmology.com/ClimateChange106.html

One of the fundamental contributing factors to the many global problems threatening civilization and the living creatures of this planet, is simply our grossly unsustainable level of over-consumption and the consequence production of waste (Cairns 2010; NAS 2010a,b,c). The rate at which the rich countries use up resources is far beyond that which can be kept up for long, even more so as the ability to mass consume spreads to the emerging middle classes in developing nations (reviewed by Moriarty and Honnery 2010). Yet it appears that many people totally fail to grasp the magnitude of the threats posed by increased consumption which is necessarily accompanied by the emissions of green house gases and other poisons and wastes (Meinschausen et al., 2009; NAS 2010a,b,c). The reductions required to prevent catastrophe are so big that they probably cannot be achieved within a consumer-capitalist society the very foundations of which rest upon economic growth and the devouring of resources (Moriarty and Honnery 2010). As detailed in three major monographs published by the National Academy of Sciences (NAS 2010a,b,c), by the year 2050, the U.S. must cut carbon emissions by 50% to 80% from 1990 levels. However, even if these drastic cuts were immediately put into effect, the U.S., would still produce 200 billion tons of greenhouse gases between the years 2010 and 2050. To survive, extremely radical change to our systems and culture are necessary (Cairns 2010; Meinschausen et al., 2009; Moriarty and Honnery 2010). Here are three lines of argument leading to this conclusion. 1. Several resources are already becoming alarmingly scarce, including petroleum, water, land, fish and food (Cairns 2010; Moriarty and Honnery 2010). If all the world’s people today were to consume resources at the per capita rate we in rich countries do, the annual supply rate would have to be more than 5 times as great as at present (Mason 2003); and if the world's population were to increase to 9 billion it would have to be about 8 times as great. Mason (2003) shows how these scarcities will probably come to a head in “the 2030 Spike”. 2. The per capita area of productive land needed to supply one Australian with food, water, settlements and energy, is 8 ha. The US figure is closer to 12 ha (reviewed by Moriarty and Honnery 2010). But when world population reaches 9 billion the per capita area of productive land available in the world will be less than .8 ha (Mason 2003). In other words the Australian footprint is already 10 times that which it will be possible for all to have. 3. An Intergovernmental Panel on Climate Change (NAS 2010a,b,c), have concluded that average global atmosphere temperatures were about 1.4 degrees warmer in the 2000-2010 decade compared with a century ago and that future fossil-fuel emissions of greenhouse gases will increase temperatures by 4 degree in the year 2015 and 11 degrees by 2100. In May of 2010, NASA and the National Oceanic and Atmospheric Administration independently reported that 2010 has been the warmest year so far recorded worldwide. Increase temperatures result in glacial melt, and rising sea levels. Therefore, ocean levels could rise by 5 feet by the end of the century. As most large cities are located near the coast and inland water ways, rising sea levels would require the movement of infrastructure and hundreds of millions of city dwellers to higher ground. The only way to combat this is through drastic reductions in carbon emissions to nearly 1990 levels (Meinschausen et al., 2009; NAS 2010a,b,c) It has been estimated that even if average economic growth was limited to 3% between now and 2080 and, given the expected 9 billion people who may populate the planet and all of whom would be expected to consume, then total world economic output each year would be 60 times as great as it is now (reviewed by Moriarty and Honnery 2010). Such multiples rule out any chance that technical advance can solve the resource and environmental problems while enabling us to go on pursuing ever-more affluent lifestyles and economic growth (Moriarty and Honnery 2010). The magnitude of the required reductions in rich world per capita resource use and environmental impact is therefore enormous, and far beyond those that any plausible technical advance might achieve. The main claim underlying tech-fix optimism is that renewable energy can substitute for fossil fuel use and sustain growth and affluence societies (reviewed by Moriarty and Honnery 2010). This assumption is seriously mistaken(Moriarty and Honnery 2010; Trainer 2008, 2010a). The amount of renewable plant required to provide the quantity of energy that would be needed through a winter month in 2050 would require annual investment some 30 times the present proportion of world GDP (Trainer 2010a). This would leave untouched the most serious problem, which is what to do when there is no sun or wind for several days in a row. Now these points only make it clear that the present situation is grossly unsustainable and will result in world wide catastrophe (Cairns 2010; Moriarty and Honnery 2010; NAS 2010a,b,c Trainer 2008, 2010a). Capitalism thrives under almost every political system, and all developing societies consume. Indeed, it could be said that since growth and profit require consumers to consume, that there is an obsession with raising levels of production and consumption all the time, as fast as possible, and without any limit. In other words the supreme, sacred, never-questioned goal of a capitalistic-consumer society is consumption which results in economic growth (Trainer 2010a,b); and with consumption there follows excretion, and the growth of these waste products threatens the very foundations of civilization.

### Collapse Inevitable – AT: Transition Now

#### No risk of widescale reform without catastrophe – the growth system is too entrenched to be removed without collapse

Ted Trainer, Visiting Fellow in the Faculty of Arts at the University of NSW, senior lecturer in sociology, 6-10-2011, On Line Opinion, “Dick Smith on growth; emphatically yes...and no,” http://www.onlineopinion.com.au/view.asp?article=12162

Dick has done a great job in presenting this general "limits to growth" analysis of our situation clearly and forcefully, and in getting it onto the public agenda. But I want to now argue that he makes two fundamental mistakes. The first is his assumption that this society can be reformed; that we can retain it while we remedy the growth fault it has. The central argument in my The Transition to a Sustainable and Just World (2010a) is that consumer-capitalist society cannot be fixed. Many of its elements are very valuable and should be retained, but its most crucial, defining fundamental institutions are so flawed that they have to be scrapped and replaced. Growth is only one of these but a glance at it reveals that this problem cannot be solved without entirely remaking most of the rest of society. Growth is not like a faulty air conditioning unit on a house, which can be replaced or removed while the house goes on functioning more or less as before. It is so integrated into so many structures that if it is dumped those structures will have to be scrapped and replaced. The most obvious implication of this kind is that in a zero growth economy there can be no interest payments at all. Interest is by nature about growth, getting more wealth back than you lent, and this is not possible unless lending and output and earnings constantly increase. There goes almost the entire financial industry I'm afraid (which recently accounted for over 40% of all profits made.) Banks therefore could only be places which hold savings for safety and which lend money to invest in maintenance of a stable amount of capital stock (and readjustments within it.) There also goes the present way of providing for superannuation and payment for aged care; these can't be based on investing to make money. The entire energising mechanism of society would have to be replaced. The present economy is driven by the quest to get richer. This motive is what gets options searched for, risks taken, construction and development underway, etc. The most obvious alternative is for these actions to be come from a collective working out of what society needs, and organising to produce and develop those things cooperatively, but this would involve an utterly different world view and driving mechanism. The problem of inequality would become acute and would not only demand attention, it would have to be dealt with in an entirely different way. It could no longer be defused by the assumption that "a rising tide will lift all boats". In the present economy growth helps to legitimise inequality; extreme inequality is not a source of significant discontent because it can be said that economic growth is raising everyone's "living standards". How would we handle unemployment in a zero-growth economy? At present its tendency to increase all the time is offset by the increase in consumption and therefore production. Given that we could produce all we need for idyllic lifestyles with a fraction of the present amount of work done, any move in this direction in the present economy would soon result in most workers becoming unemployed. There would be no way of dealing with this without scrapping the labour market and then rationally and deliberately planning the distribution of the (small amount of) work that needed doing.

## Collapse Now Good

### Collapse Now Good – Warming

#### Collapse ends emissions and removes ideological blinders – makes sustainable transition possible

Olli Tammilehto, Writer and Independent Researcher GET MORE QUALS, 2012, On the Prospect of Preventing Global Climate Catastrophe due to Rapid Social Change, Capitalism Nature Socialism, 23:1, 79-92, http://dx.doi.org/10.1080/10455752.2011.648842

An obvious way out of the climate change dilemma is to cut down production in general, primarily by reducing both institutional consumption and individual consumption by the global upper and middle class. At the same time, a transition to non-carbon energy sources should begin, phased in with moderate speed so as not to generate a peak in fossil fuel use. The record of economic depressions and collapses shows that such a plan is feasible. For example, during the Great Depression in 1929 1932, carbon dioxide emissions are estimated to have dropped by 35 percent (Sulugiuc 2009). The collapse of the Soviet Union decreased CO2 emissions 5.2 percent per year in 1989 1998 and 41 percent over the entire period (Foster, Clark, and York 2008). The recession that began in the autumn of 2008 lowered CO2 emissions in the U.S.A. and many European countries markedly. Even with the rise in China and India’s emissions, global CO2 emissions decreased in 2009 (Kolset 2010). However, reigning economic orthodoxy makes an intentional decrease in production and consumption very difficult. The beneficent character of economic growth has been a self-evident truth in the mainstream and even in most left-wing circles. Because the climate emergency makes it necessary to break this orthodoxy, the emerging degrowth movement is all the more important. Its intellectual branch is working hard to deconstruct and understand the growth paradigm.3 The contributions of Bonaiuti and Latouche in this issue and elsewhere are fine examples of this essential intellectual activity. However, these and similar texts do not explicitly deal with the antagonistic and conflict-ridden character of modern societies. Similarly, the texts mostly keep silent on the sectors or modes of existence that are only loosely integrated to the growth logic. Examples include the domestic sphere, subsistence societies, barter arrangements, and the commons, which are discussed below. Yet it may be that these precise characteristics of the present constellation are the keys to its unfolding. Even in answering the basic question, ‘‘why is economic growth so important?,’’ it is useful to remember that our societies are full of conflicts. Although it’s true that the main reason for the growth imperative is that we live in societies where the key units are profit-seeking corporations, this alone does not explain it. Because companies, besides seeking their own success and growth, are also after the death of their competitors, net growth could also be negative. But negative or zero growth in capitalism usually means increasing unemployment and social instability.4 Therefore, from the beginning of the 19th century, European economists and politicians realized that state policies must encourage and stimulate general growth in production in order to avoid social chaos. That is, people who lose their livelihoods because they themselves or their employers fail in competition would be absorbed into other growing branches of the economy (Kurz 1999). Economic growth also functions as an ideology that promises better living and prosperity for all\*i.e., it functions as a surrogate for equality and democracy under which the enormous gaps in power and wealth generated by capitalism can be maintained. This has especially been the case in Europe and North America since the beginning of the 20th century. To curb the rising tide of social change movements, the powers that be had to devise a new way to rule. The new order, later to be called fordism, was invented. It was based on mass production of relatively cheap consumer goods, the types and models of which were changed regularly and the necessity of which was inculcated in people by a new propaganda system that worked on a subconscious level (Carey 1997; Chomsky 1989). And ever since, consumerism has been the key ideology used to maintain power relations, an equation that needs economic growth to function5 (Sklair 2002). Accordingly, halting economic growth\*let alone decreasing production and consumption\*would destabilize the power establishment both socially and ideologically. That’s why power wielders are seeking to continue the growth and its concomitant fossil fuel emissions despite the dire implications of climate catastrophe. However, new perspectives on the political nature of economic growth may open up among common people despairing in the face of global warming. Aside from curtailing consumption, revisiting old struggles for real democracy and social equality is also imperative. For it follows that when the ideologically constructed prospect of everyone becoming rich ceases to exist, it will be very difficult to suppress people’s centuries-old yearning for democracy and equality. Though the chances of dethroning growth by a huge increase of social movement activities in the near future seem very slim, there are reasons why we still have hope. Social change movements exist, and there are historical experiences indicating that in dire situations these movements can change and grow rapidly. Witness, as of this writing in November 2011, the Occupy Wall Street movement that is quickly spreading around the world. History also teaches us that the combination of ongoing social struggles and a sudden crisis can cause a rapid structural change in society. However, several questionable assumptions must be overcome in order to realize that such change is possible. These assumptions relate to 1) the connection between consumption and well-being, 2) the interpretation of historical revolutions, and 3) the character of wealth and social reality in modern societies.

### Collapse Now Good – Revolution

#### The stage is set for wide scale revolution and redistribution of political power – collapse now guarantees it – causes egalitarian society

Minqi Li, associate professor of Economics at the University of Utah, 2007, “Capitalism with Zero Profit Rate?” Department of Economics Working Paper Series.

However, after centuries of limitless accumulation and growth, the global capitalist economy has expanded to the point that the underlying material foundation (the earth’s resources and the ecological system) for accumulation has been largely undermined by accumulation itself. If the analysis presented in this paper turns out to be largely correct, then the world economy will stop growing and possibly enter into a period of prolonged contraction at some point after the mid-21st century. That is, the world economic growth rate would fall towards zero and possibly become negative. What would happen to the profit rate? Given positive net investment share, zero or negative economic growth rate implies that the profit rate would have to fall towards zero. This would confirm the “law of the tendency for the rate of profit to fall” (though under a very different context). Can capitalism survive with zero profit rate? Ironically, the scenario of zero profit rate would be consistent with the “golden rule steady state” in the neoclassical Solowian model where the marginal product of capital equals the rate of depreciation and consumption is maximized. But if the profit rate does fall to zero, then what’s the point of being a capitalist? What could be the “counteracting influences” to such a scenario? If the economic growth rate falls towards zero, then the profit rate will not fall towards zero if and only if the net investment share falls towards zero or become negative. 22 It is not clear how the net investment could ever fall towards zero so long as the profit is positive and the capitalist system functions normally. Capital accumulation could bring about more profit in the future and those who do not engage in capital accumulation risk losing their status as capitalists. Therefore, under normal conditions, it seems always “rational” for individual capitalists to use a portion of their profit for the purpose of accumulation. One might say that the capitalist class as a whole faces an insoluble “prisoners’ dilemma.” It is conceivable that as the profit rate falls, the net investment share would also tend to fall. However, given the unstable nature of the capitalist economy, instead of leading to a stable state with zero net investment, the fall of the profit rate could lead to a general collapse of the investors’ confidence. In that case, the net investment share could become negative, that is, the investment level would fall below what is required to replace the depreciation of capital. Not only there would be no more capital accumulation, but capitalism would also fail to maintain simple reproduction. Hypothetically, if the net investment does fall to and manages to stabilize at zero, it means the entire capitalist profit is absorbed by capitalist consumption. In other words, the profit completely degenerates into the rent, and the capitalist class completely degenerates into a parasitical exploiter class. Can such a purely parasitical capitalism be politically and socially viable? No exploiter class could ever exist and rule the society if it does not play certain objective social function. The prosperity of the Egyptian and the Chinese empires depended on their effective management of the large-scale water works on the Nile and the Yellow River. The rule of the Catholic Church depended on its monopoly over education and knowledge in the medieval Europe. For capitalism, “development of the productive forces of social labour is the historical task and justification of capital.” (Marx, 1967[1894]: 259) The word “justification” is not used in the moral sense. The basic argument is that no social system can exist and be stable for a long period of time simply based on repression or deception. To be “sustainable”, a ruling class has to play certain indispensable function required by the mode of material production at the time. From this perspective, the capitalist class has played a historically useful role through its unique tendency to use surplus product for the purpose of capital accumulation, thus having contributed to the development of productive forces. Once it becomes a purely parasitical class (and therefore becomes “dispensable”) there would be nothing that can prevent the exploited great majority from rising up. One might argue that even a static capitalism could still be justified on the ground it is more “efficient” than any alternative social system. This immediately raises the question how efficiency is defined and measured. Presumably, a non-capitalist society defines and measures it rather differently from a capitalist society. Even if one accepts the capitalist criteria of efficiency, it is not clear capitalism is necessarily more efficient than other social systems. The theoretical case for the efficiency of capitalism largely rests upon the neoclassical ideal of perfect competition. In reality, capitalist markets are flawed in many ways (monopolies, externalities, public goods, asymmetric information, moral hazards, etc.). At the macro-level, capitalist economies are characterized by enormous wastes (unemployment, idle production capacity, advertisements, and artificial obsolescence). If all inputs (such as intensity of labor) and costs (human and environmental costs) are measured correctly, it is not obvious at all that capitalism is more efficient than non capitalist systems that have historically existed or could conceivably exist in the future. A stronger case can be made for capitalism regarding its constant drive towards technical innovation. But under capitalism, technical innovation is inseparable from capital accumulation. Both are driven by the pursuit of profit and the pressure of competition. If the net investment has fallen to zero, then presumably either the competitive pressure or the profit motive or both have become so weak that they could no longer motivate capital accumulation. What would be the unique capitalist motivation for technical innovation then? In any case, without growth (and therefore the promise and the prospect of better life in the future), why would the exploited great majority continue to tolerate all of the social ills of capitalism, such as inequality, poverty, unemployment, slavery-like working conditions in much of the world, and other failures in meeting basic social needs (health care, education, care of children and old people)? All of these, however, could prove to be purely academic and unnecessary speculations. It is quite possible that the capitalist system will not be able to survive the coming great crisis and will never reach the “steady state”. 6. The Endless History For Marx, all social systems are historical in the sense that every social system can exist only undser certain historical conditions (certain level of development of “productive forces”), but as the underlying historical conditions inevitably tend to change (the “productive forces” tend to develop), sooner or later a point would be reached when the existing social system becomes no longer historically viable (the “existing relations of production” become “fetters” of development of the “productive forces”) and has to be replaced by a new social system that is appropriate for the new historical conditions. The “productive forces” have to do with how human beings interact with the nature to produce and reproduce their material conditions of life. Under certain conditions, human beings may transform the nature to enhance the ability to meet their own needs. The transformation, however, can only take place within the limits of physical and ecological laws. Capitalism, through its pursuit of endless accumulation and growth, has fundamentally transformed the relationship between the human beings and the nature. The human activities of material production and consumption have expanded to the point that the very existence of human civilization is at stake. There cannot be a more acute expression of the conflict between the “productive forces” and the “existing relations of production,” and the conflict can only be resolved by rejecting the existing socio-economic system (assuming the humanity will survive the coming crisis). It is not the purpose of this paper to elaborate on the possible forms of post-capitalist societies. However, some broad historical constraints and possibilities may be outlined. The post-capitalist society must manage to meet the population’s basic needs in ways that are compatible with ecological sustainability. This suggests that market relations must not play a dominant role in allocating goods, services, and resources because the 33 dominance of market relations (even under conditions of simple commodity production or “market socialism” where the owners of the means of production are the workers, or the state, or various “collectives”) would inevitably force the economic players (individuals, businesses, and states) to engage in relentless competition against one another and as a result pursue profit-making and capital accumulation. The economy, therefore, must be re-organized to be based on the production for use value or basic needs. In other words, it has to be some form of planned economy.23 More importantly, there is the question whether the post-capitalist society would be a classless society where people are freed from all forms of exploitation and oppression (that is, communism). There is a distinct possibility that the enormous difficulties that the humanity has to go through in the transition from capitalism to post-capitalism could lead to a return to some form of pre-capitalism. On the other hand, capitalism will leave us with some positive legacies. Much of the world’s labor force has been transformed into proletarianized workers. The world’s exploited classes are much better educated than their predecessors. It is widely accepted by the world’s population that a legitimate government must govern through some form of democracy and some imperfect democratic political institutions have been established in much of the world. The world’s exploited classes have been influenced by various Marxist and socialist ideas and have been under different degrees of political and economic organization. The collective political strength and potential of the world’s exploited is probably stronger than any previous exploited classes at comparable historical moments. Unlike in pre-capitalist societies, it is unlikely for the post-capitalist rulers to justify their rule on religious grounds (though this cannot be completely ruled out). Moreover, the requirements of ecological sustainability would deprive them of the justification of growth. In this context, could any ruling class manage to rule without at least pretending to rule for the benefit of society as a whole? Despite all of the resources constraints discussed above, a substantial part of the technology and knowledge developed in the capitalist era may be preserved. It is possible that the post-capitalist society can have a level of labor productivity substantially above what was attained by pre-capitalist societies. Without the pressure of capital accumulation, the relatively high level of labor productivity may be used to greatly reduce the population’s labor time that has to be committed to the production of necessities. This could in turn greatly expand the scope and potential of popular political participation. These historical conditions and possibilities suggest that there could be great hope for the post-capitalist society to be more egalitarian, less exploitative and oppressive, and possibly become one with zero exploitation and oppression.

### Collapse Now Good – Complexity

#### Complexity means collapse later is more devastating than collapse now – speeding the transition provides more benefits to slowing it

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Stepping back from our orchard for a moment, we can view social organization as an investment in complexity (structure, stratification, specialization, exchange, administration, etc.) that provides a return to the investors by meeting their needs (along Maslow’s hierarchy, perhaps). The return on investment follows the same marginal return curve as in our orchard example above. Initial investments in complexity return quite well, while later investments provide minimal—or even negative—marginal return. How much benefit (compared to cost) do 100 extra government bureaucrats provide?? In modern society, diminishing marginal returns are evident in education, agriculture, energy and resource extraction, technology R&D and other critical areas. I won’t go in to all the detail here, but Tainter provides an excellent analysis of the diminishing marginal returns for societal investments in both ancient incidents of collapse (Roman, Mayan, Chacoan, etc.) as well as the modern societal investments mentioned. But despite the declining marginal returns, society is not capable of reducing expenditure, or even reducing the growth in expenditure. I discuss this at length in A Theory of Power, but the basic fact is that society is—at its very root—an evolutionary development that uses a continual increase in complexity to address social needs—and to ensure its own survival. So, as societies continue to invest more and more in social complexity at lower and lower marginal rates of return, they become more and more inefficient until eventually they are no longer capable of withstanding even commonplace stresses. They collapse. This may seem too deterministic—after all, it suggests that all societies will eventually collapse. While that may cause our inherent sense of hubris to perk up for a moment, we should remember that this equation fits our data quite well—every civilization that has ever existed has, in fact, collapsed. Our present global civilization is, or course, the sole exception. A look back at the contemporary chroniclers of history shows that every “great” civilization thinks that they are somehow different, that history will not repeat with them—and their hubris is shared with gusto by members of the present global civilization. Of course, as discrete empires and societies grow ever more cumbersome they do not always collapse in the spectacular fashion of the Western Roman Empire. If they exist in a “peer-polity” situation—that is, they are surrounded by competitors of similar levels of complexity—then they will tend to be conquered and absorbed. It is only in the case of a power vacuum—like the Chacoans or Western Romans—that we witness such a spectacular loss of complexity. In the “modern” world, we have not witnessed such a collapse as we exist in a global peer-polity continuum. When the Spanish empire grew too cumbersome the British were there to take over, and the mantel has since passed on to America, with the EU, China and others waiting eagerly in the wings. In the modern world there can no longer be an isolated collapse—our next experience with this will be global. In fact, the modern civilization continuum has existed for so long without a global collapse because we have managed to tap new energy sources—coal, then oil—each with a higher energy surplus than the last. This has buoyed the marginal return curve temporarily with each discovery, but has not changed the fundamental dynamics of collapse. Perhaps we should take a step back and look at collapse in general. Our psychological investment in the “goodness” of “high-civilization” leads to the commonly held conclusion that collapse is bad—and that to advocate it would be irrational. But from a purely economic point of view, collapse actually increases the overall benefit that social complexity provides to society for their level of investment. It makes economic sense. In the graph above, C3-B1 and C1-B1 provide the same benefit to society—but for dramatically different support burdens required to maintain their respective levels of complexity. C1-B1 is a much more desirable location for a society than C3-B1, so collapse from C3-B1 to C1-B1 is actually a good thing. With the growing burden of today’s global society, the global inequality and injustice that seems to grow daily, collapse is beginning to make economic sense. In fact, an entire philosophical movement, Primitivism, has sprung up dedicated to convincing the world that a “C1-B1”, hamlet society is in fact a far better place. Despite the growing logic of collapse, in today’s peer-polity world that option does not exist except on a global scale. Today we have 3 options: 1. Continue business as usual, accepting declining marginal returns on investments in complexity (and very soon declining overall returns) until an eventual, inevitable collapse occurs globally. Continuation of present patterns will continue the escalating environmental damage, and will continue to grow the human population, with population levels in increasing excess of the support capacity of a post-collapse Earth (i.e. more people will die in the collapse). 2. Locate a new, more efficient energy source to subsidize marginal returns on our investments in complexity. This does not mean discover more oil or invent better clean coal technology—these, along with solar or wind power still provide lower marginal returns than oil in the heyday of cheap Saudi oil. Only the development of super-efficient fusion power seems to provide the ability to delay the decline of marginal returns any appreciable amount, and this will still serve to only delay and exacerbate the eventual return to option #1. 3. Precipitate a global collapse now in order to reap the economic benefits of this action while minimizing the costs of the collapse that will continue to increase with the complexity and population of our global civilization. When combined with a strategy to replace hierarchy with rhizome, as outlined in A Theory of Power, Chapter 9, this may even represent a long-term sustainable strategy. Whoa. Am I seriously suggesting the triggering of a global collapse? For the moment I’m just suggesting that we explore the idea. If, after deliberation, we accept the totality of the three options as outlined above, then triggering collapse stands as the only responsible choice. It is—admittedly—a choice that is so far outside the realm of consideration of most people (who are strongly invested in the Myth of the West) that they will never take it seriously. But critically, it does not necessarily require their consent… These may seem like the ramblings of a madman. But in the late Western Roman Empire, there is a fact that is simply not taught today because it is too far outside our tolerance for things that run counter to the Myth of the West: The citizens of Rome wanted to end the Empire, to dissolve its cumbersome structure, but could not reverse its pre-programmed course. Many—perhaps most—welcomed the invading barbarians with open arms. So should collapse be triggered now, or should we wait as long as possible? If we accept the inevitability of collapse, then it should be triggered as soon as possible, as the cost of implementing a collapse strategy is continually growing… Throughout history, when collapse has occurred, it has been a blessing. The mainstream continues to cling to the beliefs that collapse will be a terrible loss, and that it is not inevitable. Even with all of our cultural brain-washing, do we really have so much hubris as to hold on to the tired mantra that “this time, in our civilization, things will be different”?

### Collapse Now Good – Precautionary Principle

#### Collapse now makes the precautionary principle a norm – establishes system resilience – key to avoiding numerous unanticipated catastrophes

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The main theme of the conversation is the idea of "resilience." Homer-Dixon argues powerfully that our rush towards greater efficiency has made our civilization brittle and vulnerable. The model strategy for increasing resilience is to increase redundancy and reduce unnecessary complexity -- to maintain "slack" in the system. Dembo puts this in terms of risk management: failure to maintain slack means betting everything on a single forecast. To manage risk means being prepared for scenarios we know are not going to happen (since not every scenario will come to pass, our preparations for it will prove to be redundant). We do this all the time when we take out insurance: we're prepared for our house burning down and for our house not burning down.The obvious application for this perspective is the environment. As Homer-Dixon and Dembo agree, debates about whether climate change is a real threat, or whether our carbon dioxide emissions are to blame, are irrelevant to the question of whether we should act to mitigate the damage. Even a slim chance that we are altering our environment is sufficient reason to hedge our bets by investing to reduce emissions. To do otherwise is to gamble recklessly. This is Part 1 of a two-part serialization. Ron Dembo: There are a couple of things that really stick out for me. My trouble with reading books like this is that I immediately try to think of solutions. In particular the whole notion of resilience interested me because I think you can actually simulate systems to check how resilient they are. You emphasize the concept of resilience and the need to create resilient societies. We don't put a priority on it. Imagine you are now the prime minister, and you can do what you like. What would you do to Canadian society to make it more resilient? Thomas Homer-Dixon: One of the problems would be that I don't think the conditions are ripe for the kind of paradigm change that I'm suggesting in terms of thinking of resilience. We had this enormous blackout in 2003 and it didn't get us thinking about resilience, it got us thinking about more of the same, just improving micro managing and tinkering with the grid in various ways to make sure it never happens again. But the idea of decentralized energy production, more off-grid production, or the ability of individual communities and households to reduce their dependence upon the grid, that wasn't raised at all. People unfortunately tend to think in sort of dichotomies about these things. For example, they think we need nothing but connectivity and the more connectivity the better (an example that comes up in Chapter 5). On the other hand, participants at a solar conference I attended tended to assume we want complete autonomy. In the end, we don't want either. This is sort of a goldilocks situation; we need the "just right" goal where you have a certain amount of connectivity but not too much. The problem is that to bring about change, this goal is going to have to be shared across the culture, and I'm not sure that it's there yet. So it's not going to be easy for a prime minister to change things all at once. RD: A question on dependence: If you have something that is ultra connected then does this not imply dependence? THD: Let's say we have scale-free networks, and we are highly dependent upon a few heavily connected nodes. That's potentially a very vulnerable system, especially to a targeted attack. We don't spend a lot of time mapping our networks to determine where we might be vulnerable. It's just not something that policy makers and our technocrats are encouraged to do -- there's not a demand from the public for resilience. In a sense this is my starting point -- that the public needs to realize, or needs to be educated to realize, that there is a need for something we call resilience and it's probably going to cost something in terms of productivity and efficiency, but ultimately we might be better off because we are buying insurance against shocks. And so it would be difficult to sort of just plunk me down in the role of prime minister and say ok how do you implement resilience, because you need some receptivity from the part of the public and the public will become receptive if the circumstances have changed in some way -- let's say some crises or some shocks that tell us that the existing systems are not working very well. RD: So are you saying that you would need to have a crisis before you could think about this? THD: Not entirely, because towards the end of the book I'm arguing that we need to try to improve resilience as much as possible, even prior to a crisis, because it will help us manage that crisis. I say that we need to keep breakdown constraint all the way through the book. People jumped to the conclusion without reading the book that I say catastrophe is certain. I'm not saying that. I'm saying some kind of discontinuity is very likely and may be inevitable. It doesn't have to be catastrophic, and avoiding a cascading failure may well depend upon building resilience into our systems. So you know, if I were prime minister, I guess I would start that educational process. I would say we are very vulnerable to cascading failure within our highly interlinked systems. The case of electricity, which we mentioned a moment ago, is a little different. This is a public grid and the government needs to provide it or some larger institution needs to provide it -- what social scientists would call collective action problem or a social dilemma. It's not going to be provided by individuals. RD: So how do we get the government to realize the need to distribute electricity generation? THD: Kind of a chicken and the egg problem. But that's part of why I wrote the book. Just to start to get people to think about resilience. I'll be hammering away at this issue. And others will too. RD: Some people refer to this as adaptation. THD: Yeah, but it's not adaptation. RD: It is just good risk management. THD: Right. Like the Roman engineers overbuilding their arches, or the San Fran engineers who built a parallel water supply system for firefighting in the event that the mains are broken. And what I would like to see and encourage is a leader putting this concept of resilience through redundancy into the mainstream of decision-making about the design of our society and the design of our institutions. What's Canada going to do when a nuclear bomb goes off in New York? We are not talking about that, yet they put the probability of that happening around 50% in the next ten years. RD: Well, what about an earthquake in Toronto? THD: Right, and my argument basically is that earthquakes aren't entirely exogenous. We are producing enormous stress within our ecological and social systems that creates the possibility of what I call social earthquakes; the probability is going up of major system discontinuity and we're acting as if the world is going to be the same in 50 years. Meanwhile, we are almost certain that it will be radically different. It may not be dramatically worse, but it is almost certain to be dramatically different and the changes will be discontinuous and non-linear. If we don't build resilience into our society then change could be catastrophic. RD: Well, when you get close to the limits of a system, any system, small changes can lead to chaotic results. THD: And you start to get huge amplitude swings in the system. I want to come back to that point in a moment. I want to stay with this risk management idea for now. I want to think about the point you just made. I had that working in the back of my mind: risk management. Remember our earlier conversation -- you mentioned the idea then. But I like that old distinction between risk and uncertainty, and I'd be interested to hear what you think about that distinction. Risk is something to which you can apply probability distribution of outcomes and uncertainty is something where you don't even know what the outcomes might be. There's no possibility of applying probability distribution because you don't know what the outcomes might be and you don't have any ideas of what the probabilities are, so uncertainty is characterized by unknown unknowns or ignorance of ignorance. RD: You are thinking of risk as a statistical measure. THD: And that's common in the community -- the distinction between risk and uncertainty. I think it's a useful distinction because what I try to emphasize is that this is a white wall of fog we're facing and you don't know what's around the next corner. In a world where you really don't know what's going to happen, you back off the accelerator pedal. So, that leads us to your point. When you start to approach the limits of any system, you get these high amplitude swings. You want to back away from that limit as much as possible because by the time you start to approach those cusps it's getting late in the day for adding resilience in the system. RD: Imagine that we need to choose between two strategies; and suppose that there are only two possible outcomes, scenarios A and B. Imagine we pick one particular strategy; scenario A occurs and, in hindsight, we find we were wrong. Now imagine scenario B occurs and we were wrong. In other words, there was no right answer. The question we should have asked when we were choosing a strategy was not which one is right?, but which will we regret more? The one with the larger regret is the riskier of the two. THD: Have you heard of "Pascal's wager"? I can't remember how this was stated by Pascal himself, but he proposed settling the question of religious faith with a strategy like the one you just articulated: I can believe in god or I can withhold faith; what are my regrets if I'm wrong in either of those two choices? The downside of withholding faith from a god who turns out to exist is an eternity of regret. RD: I'd love to know about that because it's really very simple. Imagine the uncertainty around global warming. Now imagine what we did was we took strong action to curb carbon dioxide emissions. What's the downside? The regret is that we will have spent too much on something that turned out not to be useful. That's not so terrible. We do that with insurance premiums all the time. On the other hand, imagine we don't spend that money and we were wrong. The regret is enormous. THD: And now you can even get more sophisticated because economists would do what they call inspected value calculation to compute some probability. If we act and we're wrong we know with 100% certainly that the cost will be, say, 2% of GDP. If we don't act and we're wrong let's say the probability of the non-linear shift in the climate is 10% and the cost is 50% of the world GDP, so you multiply the two together and you come out with a figure that is far larger. RD: It's really simple and it's what I call the "expected regret." This is really a simple argument for resilience. Imagine we assume there is enough resilience in our system, so we don't spend money on resilience and we're wrong. On the other hand, imagine a scenario in which we do spend money on resilience and we're wrong. One way of being wrong is much worse than the other. The interesting thing about regret is that it's about more than numbers. There is also the psychological fact. THD: You know, in a practical sense that is something we need to internalize within our societies, we need to be doing that kind of investment all the time, sensible management. RD: One important issue with regret is what you learn from it. If you lived in a stock market that has never gone down and you think that your kids will live to their nineties, you would never plan for the possibility of the market going down because you'd never experienced regret. That's maybe why teenagers do crazy things. They haven't experienced regret yet. Once they experience regret, they can place a higher value on it. So partly, Canadian society has been a fat cat, we've had a lot of energy, we live a good life -- our lack of regret may have blunted our faculties. For example, we haven't taken notice of many of the unintended consequences of our lifestyles. Perhaps the age of regret is around the corner. I wondered, though, why you didn't push your argument even more, because it's almost like at the end of the book you might have said, ok guys we must really focus on one or two things. What do you think we should focus on? THD: I had the fourfold prescription. Reduce the tectonic stress as much as possible. Second, adopt what I call a "prospective mind." Third, build resilience into our systems from the local level to the global level. I give examples: at the global level I talk about changing our international financial architecture so that cascading failures are less likely; I talk about distributive production of the key goods and services within economies, energy, and food. RD: There's a funny thing here -- what you're asking for seems both utterly necessary and nearly impossible. THD: It comes down to what I think of the central issue, and what the central issue is, and that's the reason I started the answer the way I did. I think there is a certain amount you can do to get people convinced about resiliency and start building it into systems, but "just in time" production for example is deeply entrenched in our economy now. It's very much a product of ferocious competition between corporations. No one corporation is going to give it up unless they all do, and no one country is going to move away from that kind of production process unless everybody does, so there's a larger challenge in the structure of economic systems which goes back for instance to all those arguments I'm trying to make in chapters 8 and 9 about the growth imperative, about the way our capital system is structured, and I don't see that changing in a fundamental way until there is a crisis of some sort. RD: I think that is the central issue -- that we are now living in a world where every economy is based on growth. You cannot do well unless you grow. Economic systems are set up that way, that if you don't grow you aren't valuable. THD: No one country can step out of that process independently without huge consequences. RD: It's hard to imagine changing that without some enormous earthquake. So if you think about reducing the stresses, well it's not that easy to do. THD: And we're not making a lot of progress, but that doesn't mean we should stop. RD: That's something we will do when we start thinking like risk managers and less like economists. THD: And start thinking about the world as a complex system and less like a machine. That's part of my public policy agenda: to get audiences to think about the world as a complex system. RD: Part of my agenda in risk was to get people to think in risk terms. You don't address only the risks you believe are actually going to come to pass; you manage the risks that could. This I really think is a big issue. We should spend time on it. THD: It takes us to the core problem of our economic systems. RD: It also takes us to a conversation about cities. We're moving towards urbanization at a shocking pace. I think for example of the massive flight from the countryside going on in China, and then I think back to Rome, the precarious megacity of its day. Do you think that large cities are inherently unstable? THD: They certainly are if we can't provide the same enormous outputs of high-quality energy that we are providing right now. So energy transition becomes the Achilles heel of this economic model. Rapid urbanization is dependent on energy availability. RD: Do you think there is such a thing as an argument against resilience. THD: No and yes. This is why if you remember at the end of the book I fly into Lebanon. I had that little discussion of the reaction in the streets of Beirut when there was an energy crisis going on and there were riots across the city. I think they were very vulnerable to energy shocks. We're going to start to see things pull apart in a similar way if there are energy shocks in the future. RD: That would be enormously challenging given the way the world has gone the last hundred years towards urbanization. To think of reversing that process today, when you think of the numbers of people involved, it becomes very challenging. THD: This is the footprint thing. It's not clear if people can move out to the countryside and be sustained. There are points at which we reach the thresholds of our imagination. Part of what I do at the end of the book is talk about open source. I want to encourage a conversation that collectively starts to imagine these possibilities. Not just the scenarios where there are shocks and large numbers of people start to move out of cities, but also what the world might look like if we somehow made the transition to a less urbanized climate. It helps to know where we are going even if the transition is messy. RD: But clearly the magnitude of a shock today is unimaginable. THD: It's the fact that these shocks are unimaginable that makes them dangerous. We are at the thresholds of our imagination because we get so locked into thinking about the way the world is now and assuming it would be like that indefinitely. RD: Ok, let's assume the opposite for a moment. Let's talk about a simultaneous shock to four major cities: London, Tokyo, New York, and Singapore. THD: This is a problem that needs to be investigated. People have talked about it but nobody has done the research. The growth of the financial system is a scale-free network. The big hubs are New York, London, Tokyo, and Singapore. What happens if you take out the financial centers of two of those? I am thinking New York and London. RD: Taking them out is not a trivial thing. THD: Let's say you set off nuclear devices in both simultaneously, and that's not an impossible scenario. So what is the impact on the global economy? It's a non-trivial research problem, but I don't think it's impractical. I'm currently having a conversation with a major bank about getting hold of their data on financial transactions and information flows, and human capital concentrations, so that you can actually map the international financial system and look to try to determine to what extent it's scale-free and what happens when you pull out these nodes. I think you can come up with a first order of approximation of what the impact would be. I would say that this is actually an emergency research issue. I think that intelligence agencies for instance should be investing significant resources to map our scale-free networks, which include financial. I read a lot on this topic, and I get no sense that anyone is doing the necessary work. But, even if half of intelligence agencies are called upon, it's classified. I think this needs some sort of public debate. There should be publicly available research done. RD: Technology is trusted to do a lot of the basic surface operational risk and methodology. How do you measure the information risk of the bank and how much capital you should put towards it? If you're HSBC and your headquarters are in London, how much capital do you need to support the fact that an office might be taken out? I really think that these things are hard to quantify. If you think about the cost of SARS to our economy, it was really high and I don't think you would have been able to forecast that. There were two little planes hitting two towers in New York and it did small numbers by Baghdad's standards - THD: -- and it cost a trillion dollars. RD: We couldn't have forecast that either. Forecasting doesn't work. Risk management and resilience do.

### Collapse Now Good – Learning

#### People will learn from past mistakes and shift towards local solutions

Chris H Lewis, Ph.D. University of Colorado at Boulder, 2000, “The Paradox of Global Development and the Necessary Collapse of Global Industrial Civilization” <http://www.cross-x.com/archives/LewisParadox.pdf>

The only alternative we now have is to recognize the very real imminent collapse of global industrial civilization. Instead of seeing this collapse as a tragedy, and trying to put "Humpty Dumpty" back together again, we must see it as a real opportunity to solve some of the basic economic, political, and social problems created and exacerbated by the development of global industrial civilization since the 1600s. Instead of insisting on coordinated global actions, we should encourage self-sufficiency through the creation of local and regional economies and trading networks.(Norgaard 1994) We must help political and economic leaders understand that the more their countries are tied to the global economic system, the more risk there is of serious economic and political collapse. The First World’s effort to impose the WTO and globalization on the rest of the world in the 1990s and early 2000s is a last ditch effort to keep global industrial civilization from unraveling. Who knows, the recent collapse of the WTO Third Ministerial meeting in Seattle in November 1999, the Jubilee 2000 movement to cancel all Third World debt, and increasing challenges to World Bank and IMF policies, might be a harbinger of this global collapse. We are witnessing the increasing collapse of global industrial civilization. My guess is that sometime between 2010 and 2050 we will see its final collapse. In the case of the collapse of Mayan civilization, those city-states and regions in Central America that were not as dependent on the central Mayan civilization, economy, and trade were more likely to survive its collapse. Those city-states who were heavily dependent on Mayan hegemony destroyed themselves by fighting bitter wars with other powerful city-states to maintain their declining economic and political dominance.(Weatherford 1994) Like the collapse of Mayan and Roman civilization, the collapse of global civilization will cause massdeath and suffering as a result of the turmoil created by economic and political collapse. The more dependent nations are on the global economy, the more economic, political, and social chaos they will experience when it breaks down. Once global industrial civilization collapses, humanity won't have the material, biological, and energy and human resources to rebuild it. This must be the real lesson that nations and polities learn from this global collapse. If they try to rebuild unsustainable regional or even international economies, it will only cause more suffering and mass-death. In conclusion, the only solution to the growing political and economic chaos caused by the collapse of global industrial civilization is to encourage the uncoupling of nations and regions from the global industrial economy. Efforts to integrate Third World countries into this global economy through sustainable development programs such as Agenda 21 will only further undermine the global economy and industrial civilization. Globalization must end, or it will bring down the global industrial civilization that spawned it. Unfortunately, millions will die in the wars and economic and political conflicts created by the accelerating collapse of global industrial civilization. But we can be assured, on the basis of the past history of the collapse of regional civilizations such as the Mayan and the Roman empires, that, barring global nuclear war, human societies and civilizations will continue to exist and develop on a smaller, regional scale. Yes, such civilizations will be violent, corrupt, and often cruel, but, in the end, less so than our current global industrial civilization, which is abusing the entire planet and threatening the mass-death and suffering of all its peoples and the living, biological fabric of life on Earth. The paradox of global economic development is that although it creates massive wealth and power for modern elites, it also creates massive poverty and suffering for underdeveloped peoples and societies. The failure of global development to end this suffering and destruction will bring about its collapse. This collapse will cause millions of people to suffer and die throughout the world, but it should, paradoxically, ensure the survival of future human societies. The collapse of global civilization is necessary for the future, long-term survival of human beings. Although this future seems hopeless and heartless, it is not. We can learn much from our present global crisis. What we learn will shape our future and the future of the complex, interconnected web of life on earth.

### Collapse Now Good – Mindset Shift

#### Crisis spurs mindset shift

Joel Kassiola, Prof of Poli-Sci @ Brooklyn College, 1990, “The death of industrial civilization,” p. 196

To sum up the main thrust of this chapter, I believe that the current industrial crisis centering on the limits to growth can be instrumental in getting citizens of advanced industrial societies to recognize the erroneous nature of the dominant postindustrial social paradigm, its way of life, and values. As a consequence, this crisis will stimulate these citizens to be conscious of their society’s deficiencies inspiring the destruction of the limitless growth illusion as well as the illusory materialist reductionism of humanity, society, and politics. What I have in mind here is that the entire growth-addictive conceptual apparatus that supports postindustrial society, the industrial ideology containing the Hobbesian conception of humanity, liberalism, materialism, and competitiveness—all must be destroyed as well. Such a cleansing process will pave the way to begin the necessary transformation of postindustrial society to a transindustrial one; one not burdened by these weaknesses that are potentially fatal to our planet and all of its inhabitants.

### AT: Regrowth

#### Collapse now creates sustainable local alternatives – societies that don’t transition, fade away

Chris Lewis, PHD in American Studies, Sewall Academic Program; University of Colorado at Boulder, 1997, “The Paradox of Global Development and the Necessary Collapse of Modern Industrial Civilization, Part of The Coming Age of Scarcity,” p44-45

Since its birth in sixteenth- and seventeenth-century Europe, the modern world, driven by the desire to accumulate wealth and control human and natural resources, has waged a brutal war against the earth. In Extinction, biologists Paul and Anne Ehrlich (1981, 8) note that “never in the 500 million years of terrestrial evolution has this mantle we call the biosphere been under such savage attack.” In their 1993 World Scientists’ Warning to Humanity, signed by more than 1680 scientists worldwide, concerned scientists warned that “human activities inflict harsh and often irreversible damage on the environment and on critical resources” (Union of Concerned Scientists 1993, 3). Tragically, the modern world’s relentless struggle to conquer and subdue the earth in the name of progress will bring its collapse and ruin. Its vain struggle to control and defeat the awesome power of nature will, in the end, destroy modern industrial civilization. I will argue that we are witnessing the collapse of global industrial civilization. Driven by individualism, materialism, and the endless pursuit of wealth and power, the modern industrialized world’s efforts to modernize and integrate the world politically, economically, and culturally since World War II are only accelerating this global collapse. In the late-twentieth century, global development leaves 80 percent of the world’s population outside the industrialized nations’ progress and affluence (Wallimann 1994). When the modern industrialized world collapses, people in the underdeveloped world will continue their daily struggle for their dignity and survival at the margins of a moribund global industrial civilization. With the collapse of the modern world, smaller, autonomous, local and regional civilizations, cultures, and polities will emerge. We can reduce the threat of mass death and genocide that will surely accompany this collapse by encouraging the creation and growth of sustainable, self-sufficient regional polities. John Cobb has already made a case for how this may work in the United States and how it is working in Kerala, India. After the collapse of global civilization, modern peoples will not have the material resources, biological capital, and energy to reestablish global civilization. Forced by economic necessity to become dependent on local resources and ecosystems for their survival, peoples throughout the world will work to conserve and restore their environments. For the societies that destroy their local environments and economies, as modern people so often do, will themselves face collapse and ruin. Thus the rapid expansion of modern industrial civilization since the 1600s, which modern peoples understand as progress, is destroying the earth and threatening the human future (Hauchler and Kennedy 1994). Since the birth of the modern world, we have witnessed accelerating global population growth, air and water pollution, destruction of forests, farmland, and fisheries, depletion of nonrenewable natural resources, loss of biodiversity, and increasing poverty and misery throughout the nonmodern world (Brown and Kane 1994). In Worldwatch’s State of the World 1995, Hilary French (1995, 171) concludes: “The relentless pace of global ecological decline shows no signs of letting up. Carbon dioxide concentrations are mounting in the atmosphere, species loss continues to accelerate, fisheries are collapsing, land degradation frustrates efforts to feed hungry people, and the earth’s forest cover keeps shrinking.” And in his introduction to State of the World 1995, Lester Brown (1995) warns that eroding soils, shrinking forests, deteriorating rangelands, expanding deserts, acid rain, stratospheric ozone depletion, the buildup of greenhouse gases, air pollution, and the loss of biological diversity threatens global food production and future economic growth. How could this rapid growth in wealth, population, science and technology, and human control over the natural world have produced such catastrophic results?

### AT: Elite Backlash

#### Elites will change their attitudes

Joel Jay Kassiola, Dean of the College of Behavioral and Social Sciences, San Francisco State University, 1990, The Death of Industrial Civilization, p.194

Moreover, as a result of disappointment, Wildean tragedy, and value erosion, the postindustrial elite (the current members of the beneficiary class within the dominant, postindustrial social paradigm and structure) might come to a realization unique in history. The elite, postindustrial consciousness may be shocked into change by increasingly conspicuous limits to growth as well as by the profoundly challenging nature of the limits-to-growth literature: the futility, insecurity, and disaster looming in our foreseeable future (unlike the predicted long-range disaster of our sun burning up in several billion years), and a future filled with the preoccupation of seeking to maintain their relative advantages and ceaselessly fend off all of the others seeking to replace them. The enjoyment of the elite’s present success seems short-lived, unstable, and increasingly inadequate relative to both the concern and effort expended in attaining such “success” in the first place, and the rising costs of maintaining their celebrated position on top.

### AT: Human Nature

#### There’s no growth imperative locked in human nature – it’s the result of a widespread campaign to make growth look benign

Joel Magnuson, Ph.D. internationally recognized economist specializing in non-orthodox approaches to political economy, professor of economics in Portland, Oregon, a visiting fellow at the Ashcroft International Business School at Anglia Ruskin University, Cambridge, England, 2-24-2010, “Growth and Consumerism: Nature or Nurture?” Climate and Capitalism, http://climateandcapitalism.com/2010/02/24/growth-and-consumerism-nature-or-nurture/

The acceptance of the growth imperative has become deeply infused in American culture and thought. Most Americans would rather ignore the inevitable environmental damage that ongoing growth causes than question it. As long as people are feeling benefits of growth, and that those benefits outweigh the damage it causes, people are likely to accept the idea that ongoing economic growth is benign. If this changes, however, and if it becomes clear that the damage outweighs the benefits, then a crisis in the perception of growth will emerge. This shift in perception is bound to occur at some point because of the scientific fact that ongoing growth is not possible. This is perhaps the single most deleterious consequence of the capitalist system. The system is based on a fundamental contradiction that, on the one hand, it must continue to grow, but on the other hand, it cannot. Many people seem to be more willing to accept even illusions of growth rather than directly face and reconcile this contradiction. One such illusion of growth is a financial market “bubble.” Market bubbles occur when speculators inflate prices far above what would be considered reasonable. A steady rise in stock values or housing prices can make those who own these financial assets feel wealthier. If growth in the value of financial assets is not supported by growth in the real economy of goods and services, then it is growth on paper only and the feeling of greater wealth is merely an illusion. Such illusions can suddenly transform into a harsh reality when the bubbles inevitably burst, prices fall, and the paper wealth collapses. For the few who sell prior to the collapse — as top Enron executives did moments before the company famously plunged into bankruptcy — the growth in wealth is real, as they can take their profits and buy real goods or property. But for the majority who lose, their losses are also real as their life savings evaporate. With winners and losers offsetting each other, bubbles in stocks, bonds, gold, or real estate are typically zero-sum situations that do not represent real growth in wealth, but rather an upward redistribution of existing wealth. Some real growth can hitch a ride on bubbles such as a booming housing construction industry that rides along with a bubble in the housing market, but these industries also suffer tremendously when the market bubbles burst. Bubbles aside, capitalism is a money-based system. Growth is tracked and measured in monetary or financial terms such as the dollar-value of GDP or securities. For economic growth to be real and not an illusion, increases in these monetary measurements must be anchored to real growth in production. If not, then there will be a fundamental disconnect between the financial and the real, and this disconnect will become a source of instability. In other words, if the stock market shows a steady increase in values of say 7 percent per year but real production of goods and services grows by only 3 percent, then the money wealth represented in stock prices begins to pull away from what one can buy with that money. Money begins to lose its real purchasing power and, as we saw in Chapter Five, a sustained decline in the value of money eventually leads to economic collapse. A key factor in maintaining economic stability is to maintain a stable proportion between monetary growth and growth in the goods that you can buy with that money. The paramount purpose of capitalism is to provide steady returns to investors. These returns are measured by growth in the value of the financial instruments the investors own, and for this growth to be real and stable, it must be supported by real growth in the production and sales of goods and services in the economy overall. A common misconception about the growth imperative is that it is driven by American consumers who are driven by a deeper impulse to buy and have more things. The cultural phenomenon of consumerism does not push the capitalist economy to grow, but rather is a byproduct of the capitalist system’s growth imperative. Consumers do not push into the malls to buy things as much as they are pulled into the malls by the producers’ desperate need to sell more and more. Consumerism: Nurture Not Nature The term consumerism is used to describe a cultural norm that equates personal well-being with purchasing more and better material possessions. If this were a natural human impulse, then economic growth would naturally follow human nature. At some primal level, we can see that economic growth is in fact necessary for our survival and success as species. Economist Thorstein Veblen asserted that a deeply rooted tendency of human beings is to see that our offspring have a fair chance at a good life. Veblen referred to this tendency as a “parental instinct.” Driven by this instinct, Veblen argues, each generation seeks to make their material standard of living better than the last, causing the economy to grow to higher and higher levels of production. If what Veblen tells us is true, then at some level we are by our nature driven to achieve economic growth. This primal instinct, however, has very little to do with the systemic imperative to grow into what is now an already massive $11 trillion-dollar economy. In fact, the parental instinct to assure a good life for our offspring and ongoing growth are actually contradictory goals as endless growth promises to deplete available resources and undermine the welfare of future generations. Ongoing growth entails using more and more inputs or resources. As these resources are depleted, the productive capacity of future generations is compromised, as will be their chance at a decent livelihood. Moreover, the things people really want for their children — good schools, clean and functional neighborhoods, healthy and vibrant natural environment, economic stability and security — are those that are least likely to be offered in the growth-driven capitalist system. Veblen identified that alongside the parental instinct is a “predatory instinct,” which is also a deeply rooted human tendency toward certain behavior. Predatory behavior is not concerned with caring for future generations as much as with conquests and self-aggrandizement. Coining terms such as “pecuniary emulation” and “conspicuous consumption,” Veblen was one of the first economists to identify the predatory impulse to achieve social status through owning and consuming more and more goods. In Veblen’s view, bigger and better and more goods are consumerist trophies celebrating the prowess and skill of the predator like the taxidermy heads of animals displayed on the hunter’s game room walls. For Veblen, the simultaneous existence of these instincts — the parental instinct to care for our young and the predatory instincts of ostentatious consumption and competitive acquisition — stand in an antagonistic relationship and are emblematic of modern life. Whether their primary impulse stems from a parental or a predatory instinct, the generally accepted view in American culture is that consumers are sovereign in the marketplace. Most proponents as well as critics of capitalism hold the belief that consumer demand is the prime mover in the basic economic processes. That is, consumers will express their demands in the markets and businesses dutifully follow. Proponents argue that growth serves to satisfy the demands of people, and critics argue that people are selfishly, or perhaps unwittingly, creating their own destruction with excessive demands. In either view, the line of causality begins with consumption and consumption drives production. We challenge this viewpoint and argue that consumerism is a cultural phenomenon that was created as part of a broader systemic need of the capitalist economy to grow. Profits from sales are the source of returns to capitalist investors, and these returns cannot be sustained if people do not sustain high levels of consumption. The relentless drive for profits created the consumer culture that fuels the economic machine. If consumerism did in fact stem from a natural instinct of the human species, it was not evident among most Americans in the nineteenth century. One of the problems facing capitalism throughout the nineteenth century was chronic overproduction. Businesses were producing goods for the market, but people tended to be frugal, self-sufficient, and were reluctant to spend their earnings on more and more consumer goods. More often than not, people tended to follow the ethic expressed in Christian Proverbs, “He that tilleth his land shall have plenty of bread: but he that followeth after vain persons shall have poverty enough … Remove far from me vanity and lies: give me neither poverty nor riches; feed me with food convenient for me.” For many Americans at that time, conspicuous consumption — overtly consuming and buying to display social status — was unseemly. By the turn of the twentieth century, businesses began searching for new ways to get people to spend more of their earnings on consumer goods. In order to sell goods in volume, businesses began deploying revolutionary methods designed to entice people into consumer indulgences that were previously considered frivolous or unnecessary. In his description of America in the early twentieth century as “The Dawn of a Commercial Empire,” cultural historian and author, William Leach writes: “After 1880, American commercial capitalism, in the interest of marketing goods and making money, started down the road of creating … a set of symbols, signs and enticements … From the 1880s onward, a commercial aesthetic of desire and longing took shape to meet the needs of business. And since that need was constantly growing and seeking expression in wider and wider markets, the aesthetic of longing and desire was everywhere and took many forms … this aesthetic appeared in shop windows, electrical signs, fashion shows, advertisements, and billboards.” To satisfy the growth imperative of capitalism, the marketing and advertising industry was born. By the “roaring 1920s,” consumerism, molded by the nascent advertising industry, was in full swing and established itself not as a fad, but as a permanent and central feature of American culture. Today, advertising is a several hundred-billion-dollar industry, which is about ten times the entire GDP of the U.S. economy at the turn of the twentieth century when the industry began. Capitalism has a systemic need to sell things. If people show no inclination to buy these things, then the capitalist machine will break down. To survive, capitalism must find ways — manipulation and seduction if necessary — to get people to buy more and more things that potentially have little or no relevance to their physical or spiritual well-being, or to that of their offspring. Consumerism is a product of modern marketing techniques that stimulate deep psychological impulses to consume, not because it makes them better off, as consumption may or may not make them better off, but because the growth imperative of the capitalist machine requires it.

### AT: Human Nature

#### Growth imperative isn’t biologically determined – gene expression is the result of social adaptation

Nicolas Gergaud, Candidate for a Masters in environmental resource management, University of Natural Resources and Life Sciences, Austria, 3-13-2012, “Growth doxa and human nature fallacy,” Ex-Path, http://nicowien.wordpress.com/2012/03/13/growth-doxa-and-human-nature-fallacy/

1) The first one concerns homo sapiens. In biology, especially in genetics, it has been found that epigenetic mechanisms (external factors that regulate gene activity without altering the DNA sequences) play a major role in the gene expression. In other words, the gene activity (whether expressing or silencing) is influenced by its environment (Jaenisch & Bird, 2003). This concerns not only phenotypic issues, but also behavior ones. In a recent paper entitled “epigenetic regulation in psychiatric orders” Tsankova et al. (2007) shed light on “sustained epigenetic mechanisms of gene regulation in neurons that have been implicated in the regulation of complex behavior, including abnormalities in several psychiatric disorders such as depression, drug addiction and schizophrenia” (Tsankova et al., 2007). Thus the epigenetic mechanisms may have a genuine role in shaping behavioral dispositions. These findings disavow any genetic determinism theory and therefore tackle any dubious reason for eugenics or other racial classifications among human beings. 2) Secondly, homo sociologicus (Dahrendorf, 1965) comportments are principally a reflective reproduction of his socio-cultural environment (Accardo, 2006). For instance, when Max Weber stated that “the most important opponent with which the capitalist spirit has had to struggle is traditionalism”, he recognized that culture (reproduced and sustained through traditions) is crucial by the determinism of human behavior. To illustrate his words, Weber picked up the following example from a capitalism-oriented farmer who wants to maximize his profits through monetary incentives. Since the harvest rates are weather dependent, during the harvest season the agricultural land owner will use a system of piece-rates in order to raise the productivity of his workmen. By doing so he follows the simple logic: the more the workers gather, the more they earn. Thus a rise of the piece-rates will increase the harvesting efficiency, as workers would have the willingness to increase their wages by gathering more. Nevertheless, this strategy has not been systematically successful. “Raising the piece-rates has often had the result that not more, but less, has been accomplished in the same time, because the worker reacted to the increase not by increasing, but by decreasing, his amount of work” (Weber, 1930). Pierre Bourdieu brought out the same peculiar finding in his book “The Sociology of Algeria” (1958). The French sociologist outlined Algerian peasants (then under colonial rules) who were indifferent toward profit. Indeed, they were only concerned by maintaining their wages conform to their traditional needs. They were living in frugality. Actually, before the auri sacra fames (the greed for gold) surged in some parts of Algeria, time and productivity were no matter for the inhabitants. In short, rational economic arithmetic was not part of traditionalism’ spirits (Bourdieu, 1958; Rabhi, 2010). These are also examples of what Weber meant by the word “traditionalism”. For him, “a (hu)man does not possess a natural urge to earn more and more money, but simply to live as he is accustomed to live and to earn as much as is necessary for that purpose” (Weber, 1930). Thus, Ainsworth ignores objectively that the “genome learns from its experience” (Jaenisch & Bird, 2003) and that the society, in which human beings live, do influence their behaviors. For instance, Thorstein Veblen, who coined the term conspicuous consumption, explained that human economic behavior are “emulated” (imitation of members of higher status). Therefore, the “aspiration for increasing material consumption should not be taken for granted, but seen as a specific cultural-historical construct that may easily change” (Schneider et al., 2010).

### AT: Human Nature

#### It’s not inevitable – humans are inherently empathetic

Jeremy Rifkin, President of the Foundation on Economic Trends, 1-11-2010, “'The Empathic Civilization': Rethinking Human Nature in the Biosphere Era,” Huffington Post, http://www.huffingtonpost.com/jeremy-rifkin/the-empathic-civilization\_b\_416589.html

The problem runs deeper than the issue of finding new ways to regulate the market or imposing legally binding global green house gas emission reduction targets. The real crisis lies in the set of assumptions about human nature that governs the behavior of world leaders--assumptions that were spawned during the Enlightenment more than 200 years ago at the dawn of the modern market economy and the emergence of the nation state era. The Enlightenment thinkers--John Locke, Adam Smith, Marquis de Condorcet et. al.--took umbrage with the Medieval Christian world view that saw human nature as fallen and depraved and that looked to salvation in the next world through God's grace. They preferred to cast their lot with the idea that human beings' essential nature is rational, detached, autonomous, acquisitive and utilitarian and argued that individual salvation lies in unlimited material progress here on Earth. The Enlightenment notions about human nature were reflected in the newly minted nation-state whose raison d'être was to protect private property relations and stimulate market forces as well as act as a surrogate of the collective self-interest of the citizenry in the international arena. Like individuals, nation-states were considered to be autonomous agents embroiled in a relentless battle with other sovereign nations in the pursuit of material gains. It was these very assumptions that provided the philosophical underpinnings for a geopolitical frame of reference that accompanied the first and second industrial revolutions in the 19th and 20th centuries. These beliefs about human nature came to the fore in the aftermath of the global economic meltdown and in the boisterous and acrimonious confrontations in the meeting rooms in Copenhagen, with potentially disastrous consequences for the future of humanity and the planet. If human nature is as the Enlightenment philosophers claimed, then we are likely doomed. It is impossible to imagine how we might create a sustainable global economy and restore the biosphere to health if each and every one of us is, at the core of our biology, an autonomous agent and a self-centered and materialistic being. Recent discoveries in brain science and child development, however, are forcing us to rethink these long-held shibboleths about human nature. Biologists and cognitive neuroscientists are discovering mirror-neurons--the so-called empathy neurons--that allow human beings and other species to feel and experience another's situation as if it were one's own. We are, it appears, the most social of animals and seek intimate participation and companionship with our fellows. Social scientists, in turn, are beginning to reexamine human history from an empathic lens and, in the process, discovering previously hidden strands of the human narrative which suggests that human evolution is measured not only by the expansion of power over nature, but also by the intensification and extension of empathy to more diverse others across broader temporal and spatial domains. The growing scientific evidence that we are a fundamentally empathic species has profound and far-reaching consequences for society, and may well determine our fate as a species.

## Growth Bad – Environment

### Growth Bad – Environment

#### Growth pushes us into an unsustainable level of warming – efficiency and innovation can’t solve – also destroys the entire environment

Andrew Simms, policy director of the new economics foundation, the award-winning UK think-and-do tank, and head of nef's Climate Change Programme, 1-25-2010, “Growth is good … isn't it?” The Guardian, http://www.guardian.co.uk/commentisfree/cif-green/2010/jan/25/uk-growth-energy-resources-boundaries

The banking crisis taught us that when things look good on paper, if the underlying accounting system is faulty, it can conceal high risk and imminent disaster – as Jared Diamond put it in Collapse, his book about societies throughout history that fell by wrongly estimating the resilience of their environmental life-support systems. What looks like wealth might just be a one-off fire sale of irreplaceable natural capital. Ecologically speaking, he writes, "an impressive-looking bank account may conceal a negative cashflow". To avoid collapse the economy has to operate within thresholds that do not critically undermine the things that we depend on on a daily basis. They're often interconnected, like a sufficiently stable climate, productive farmland, fresh water and a healthy diversity of plants and animals. On climate change, a new piece of research by the New Economics Foundation thinktank looks at which rates of global economic growth are compatible with prevention of a dangerous level of warming. It shows that, even with the most optimistic likely uptake of low-carbon energy, it is seemingly impossible to reconcile a growing global economy with a good likelihood of limiting global temperature rise to 2C, the agreed political objective of the European Union, and widely considered the maximum rise to which humanity can adapt without serious difficulty. In this context, Adair Turner, chair of the Financial Services Authority and the Committee on Climate Change, refers to the pursuit of growth for its own sake as a "false god". Other work by Professor Kevin Anderson of the Tyndall Centre for Climate Change Research at Manchester University concludes that: "Economic growth in the OECD cannot be reconciled with a 2C, 3C or even 4C characterisation of dangerous climate change." The problem is that growth drowns out the gains from increased efficiency and technological innovation. The New Economics Foundation study looks at by how much growth would need to be delinked from fossil fuels – the so-called carbon intensity of the economy – to reach the mark of climate safety suggested by Nasa climate scientist James Hansen. Having improved steadily in the late last century, "carbon intensity" changes flatlined over the last decade and even worsened in some years. Against this trend, to avoid dangerous climate change the fall in carbon intensity would need to improve by more than two hundredfold. The economic doctrine of growth collides headlong with the laws of physics and thermodynamics. Only so much energy efficiency can be squeezed from a system. The other problem is the counter-intuitive rebound effect spotted by William Stanley Jevons in 1865 when he wrote, "It is a confusion of ideas to suppose that the economical use of fuel is equivalent to diminished consumption. The very contrary is the truth." Increased efficiency tends to lower costs and perversely drives up overall resource use. Writing in the science journal Nature last year, a multidisciplinary group of scientists identified nine key safe-use planetary resource boundaries, three of which had already been transgressed (climate change, biodiversity and the nitrogen cycle to do with farming). We are on the cusp of several others.

### Growth Bad – Environment

#### Necessary emission reductions can only be achieved through de-dev

Andrew Simms, policy director of the new economics foundation, the award-winning UK think-and-do tank, and head of nef's Climate Change Programme, 2-1-2012, “Clinging to economic growth suffocates the imagination,” Guardian, www.guardian.co.uk/commentisfree/2012/feb/01/limits-to-economic-growth

For one thing, the model used by the MIT scientists didn't make precise "predictions", but projected what was likely to happen if certain trends continued, allowing for "adjustable assumptions" of resource use. Their real finding was not that collapse was likely to occur by a particular year, but that population and the global economy would contract rapidly after peaking. The only circumstances under which some kind of stabilisation, rather than collapse, was achieved, was constraining population and the scale of the economy. Models and reality are not the same thing. But – strikingly given the relatively crude computer modelling available at the time – the MIT projections have proved remarkably accurate. Today they can be checked against decades of actual data. Population, industrial output, pollution and food consumption all track the lines in the model. There is a popular view that economic growth can be saved by efficiency measures, recycling and technological substitution, such as nuclear and renewable energy replacing fossil fuels. Yet the model allowed even for these variables, and crashed under the pressure of growth just the same. I took part in a debate last week with Michael Jacobs who was an environmental adviser to Gordon Brown's Treasury. My job was to respond to a lecture he gave at University College London called The Green Moment? The Crises of Capitalism and the Response of Progressive Politics. Jacobs's critique, which several on the left share, is that pointing out the non-viability of economic growth (at least at the global aggregate level and where rich countries are concerned) is a mistaken article of faith in the green movement. His argument is that, firstly, opposing growth is bad politics, it's bad spin for the green movement that "puts people off". Secondly he argues that low growth is compatible, even in rich countries, with environmental constraints. The first point is immaterial if the limits are scientifically real. It is an inconvenient reality that cannot be spun away. The second point is a claim that must be backed with evidence, it cannot simply be asserted. And while I have yet to see any figures to illustrate how growth in rich countries can, in perpetuity, be compatible with environmental limits, several assessments point to the opposite conclusion. The Tyndall Centre for Climate Change Research at Manchester University found that to prevent dangerous global warming, economic growth in rich countries would not be possible. With colleagues at the New Economics Foundation, I came to a similar conclusion. Jacobs quotes, admiringly, the work of Tim Jackson on "prosperity without growth" with the former government advisory body the Sustainable Development Commission. Yet Jackson's work too, as the name suggests, foresees a future without growth. Work by the Stockholm Resilience Centre on environmental "planetary boundaries" shows several have already been transgressed, requiring large absolute reductions of consumption in rich countries. One thing is sure: advocates of growth need to be able to show not only that environmental impact can be cancelled out by efficiency and resource substitution, but that deep, absolute reductions in resource use can be achieved simultaneously, and that such gains can be made year, after year, after year, ad infinitum. A key insight by the original MIT group was the problem of time lag. Environmental problems became obvious and were acted on too late. Damage became locked in. This is the moment we are now living through. Nasa climate scientist James Hansen recently pointed out that if the rich world had started reducing emissions as recently as 2007, the annual reductions necessary would have been 3%. Wait until next year and the figure rises to 6%, wait further until 2020 and the annual target leaps to a staggering 15% reduction per year. Bear in mind that the Stern Review on the economics of climate change found that annual emissions reductions greater than 1% have "been associated only with economic recession or upheaval".

### Growth Bad – Linear Impacts

#### The impact is linear and diverse – multiple sources of extinction – collapse now is better

Glen Barry, Ph.D. in Land Resources from the University of Wisconsin-Madison, MS in Conservation Biology and Sustainable Development from Madison, Founder and President of Ecological Internet, 1-5-2010, “EARTH MEANDERS: Resisting Global Ecological Change,” EcoEarth, http://www.ecoearth.info/blog/2010/01/earth\_meanders\_resisting\_globa.asp

The human family faces imminent and (Copenhagen would suggest) inevitable collapse of the biosphere – the thin layer of life upon an otherwise lifeless planet – that makes Earth habitable. Marshes and rivers and forests and fish are far more than resources – they and all natural ecosystems are a necessity for humanity’s existence upon Earth. A few centuries of historically unprecedented explosion in human numbers and surging, albeit inequitable, consumption and resultant resource use, ecosystem destruction and pollution; is needlessly destroying being for all living things. Revolutionary action such as ending coal use, reforming industrial agriculture and protecting and restoring old forests and other natural ecosystems, is a requirement for the continuation of shared human being. Earth is threatened by far more than a changing atmosphere causing climate change. Cumulative ecosystem destruction – not only in climate, but also water, forests, oceans, farmland, soils and toxics -- in the name of “progress” and “development” -- threatens each of us, our families and communities, as well as the Earth System in total and all her creatures. Any chance of achieving global ecological sustainability depends urgently upon shifting concerns regarding climate change to more sufficiently transform ourselves and society to more broadly resist global ecological change. Global ecological, social and economic collapse may be inevitable, but its severity, duration and likelihood of recovery are being determined by us now. It does not look good as the environmental movement has been lacking in its overall vision, ambition and implementation. The growing numbers of ecologically literate global citizens must come forward to together start considering ecologically sufficient emergency measures to protect and restore global ecosystems. We need a plan that allows humans and as many other species as possible to survive the coming great ecological collapse, even as we work to soften the collapse, and to restore to the extent practicable the Earth’s ecosystems. This mandates full protection for all remaining large natural ecosystems and working to reconnect and enlarge biologically rich smaller remnants that still exist. It is time for a hard radical turn back to a fully functioning and restored natural Earth which will require again regaining our bond with land (and air, water and oceans), powering down our energy profligacy, and taking whatever measures are necessary to once again bring society into balance with ecosystems. This may mean taking all measures necessary to stop those known to be destroying ecosystems for profit. As governments dither and the elite profit, it has become dreadfully apparent that the political, economic and social structures necessary to stop human ecocide of our and all life’s habitats does not yet exist. The three hundred year old hyper-capitalistic and nationalistic growth machine eating ecosystems is not going to willingly stop growing. But unless it does, human and most or all other life will suffer a slow and excruciating apocalyptic death. Actions can be taken now to soften ecological collapse while maximizing the likelihood that a humane and ecologically whole Earth remains to be renewed.

### Growth Bad – Resource Depletion

#### Current energy consumption rates cause extinction – alternative energy technologies fail and produce their own negative feedbacks, only reduction in consumption can solve

David Ehrenfeld, Dept. of Ecology, Evolution, and Natural Resources @ Rutgers University, April 2005, “The Environmental Limits to Globalization,” Conservation Biology, Pages 318–326 Volume 19, No. 2, April 2005, Ebsco.

Among the environmental impacts of globalization, perhaps the most significant is its fostering of the excessive use of energy, with the attendant consequences. This surge in energy usewas inevitable, once the undeveloped four-fifths of theworld adopted the energy-wasting industrialization model of the developed fifth, and as goods that once were made locally began to be transported around the world at a tremendous cost of energy. China’s booming production, largely the result of its surging global exports, has caused a huge increase in the mining and burning of coal and the building of giant dams for more electric power, an increase of power that in only the first 8 months of 2003 amounted to 16% (Bradsher 2003; Guo 2004). The many environmental effects of the coal burning include, most importantly, global warming. Fossil-fueldriven climate change seems likely to result in a rise in sea level, massive extinction of species, agricultural losses from regional shifts in temperature and rainfall, and, possibly, alteration of major ocean currents, with secondary climatic change. Other side effects of coal burning are forest decline, especially from increased nitrogen deposition; acidification of freshwater and terrestrial ecosystems from nitrogen and sulfur compounds; and a major impact on human health from polluted air. Dams, China’s alternative method of producing electricity without burning fossil fuels, themselves cause massive environmental changes. These changes include fragmentation of river channels; loss of floodplains, riparian zones, and adjacent wetlands; deterioration of irrigated terrestrial environments and their surface waters; deterioration and loss of river deltas and estuaries; aging and reduction of continental freshwater runoff to oceans; changes in nutrient cycling; impacts on biodiversity; methylmercury contamination of food webs; and greenhouse gas emissions from reservoirs. The impoundment of water in reservoirs at high latitudes in the northern hemisphere has even caused a small but measurable increase in the speed of the earth’s rotation and a change in the planet’s axis (Rosenberg et al. 2000; V¨or¨osmarty & Sahagian 2000). Moreover, the millions of people displaced by reservoirs such as the one behind China’s Three Gorges Dam have their own environmental impacts as they struggle to survive in unfamiliar and often unsuitable places. Despite the importance of coal and hydropower in China’s booming economy, the major factor that enables globalization to flourish around the world—even in China—is still cheap oil. Cheap oil runs the ships, planes, trucks, cars, tractors, harvesters, earth-moving equipment, and chain saws that globalization needs; cheap oil lifts the giant containers with their global cargos off the container ships onto the waiting flatbeds; cheap oil even mines and processes the coal, grows and distills the biofuels, drills the gas wells, and builds the nuclear power plants while digging and refining the uranium ore that keeps them operating. Paradoxically, the global warming caused by this excessive burning of oil is exerting negative feedback on the search for more oil to replace dwindling supplies. The search for Arctic oil has been slowed by recent changes in the Arctic climate. Arctic tundra has to be frozen and snow-covered to allow the heavy seismic vehicles to prospect for underground oil reserves, or longlasting damage to the landscape results. The recent Arctic warming trend has reduced the number of days that vehicles can safely explore: from 187 in 1969 to 103 in 2002 (Revkin 2004). Globalization affects so many environmental systems in so many ways that negative interactions of this sort are frequent and usually unpredictable. Looming over the global economy is the imminent disappearance of cheap oil. There is some debate about when global oil production will peak—many of the leading petroleum geologists predict the peak will occur in this decade, possibly in the next two or three years (Campbell 1997; Kerr 1998; Duncan & Youngquist 1999; Holmes & Jones 2003; Appenzeller 2004; ASPO 2004; Bakhtiari 2004; Gerth 2004)—but it is abundantly clear that the remaining untapped reserves and alternatives such as oil shale, tar sands, heavy oil, and biofuels are economically and energetically no substitute for the cheap oil that comes pouring out of the ground in the Arabian Peninsula and a comparatively few other places on Earth (Youngquist 1997). Moreover, the hydrogen economy and other high-tech solutions to the loss of cheap oil are clouded by serious, emerging technological doubts about feasibility and safety, and a realistic fear that, if they canwork, they will not arrive in time to rescue our globalized industrial civilization (Grant 2003; Tromp et al. 2003; Romm 2004). Even energy conservation, which we already know how to implement both technologically and as part of an abstemious lifestyle, is likely to be no friend to globalization, because it reduces consumption of all kinds, and consumption is what globalization is all about. In a keynote address to the American Geological Society, a noted expert on electric power networks, Richard Duncan (2001), predicted widespread, permanent electric blackouts by 2012, and the end of industrial, globalized civilization by 2030. The energy crunch is occurring now. According to Duncan, per capita energy production in the world has already peaked—that happened in 1979—and has declined since that date. In a more restrained evaluation of the energy crisis, Charles Hall and colleagues (2003) state that: The world is not about to run out of hydrocarbons, and perhaps it is not going to run out of oil from unconventional sources any time soon. What will be difficult to obtain is cheap petroleum, because what is left is an enormous amount of low-grade hydrocarbons, which are likely to be much more expensive financially, energetically, politically and especially environmentally. Nuclear power still has “important. . .technological, economic, environmental and public safety problems,” they continue, and at the moment “renewable energies present a mixed bag of opportunities.” Their solution? Forget about the more expensive and dirtier hydrocarbons such as tar sands. We need a major public policy intervention to foster a crash program of public and private investment in research on renewable energy technologies. Perhaps this will happen—necessity does occasionally bring about change. But I do not see renewable energy coming in time or in sufficient magnitude to save globalization. Sunlight, wind, geothermal energy, and biofuels, necessary as they are to develop, cannot replace cheap oil at the current rate of use without disastrous environmental side effects. These renewable alternatives can only power a nonglobalized civilization that consumes less energy (Ehrenfeld 2003b). Already, as the output of the giant Saudi oil reserves has started to fall (Gerth 2004) and extraction of the remaining oil is becoming increasingly costly, oil prices are climbing and the strain is being felt by other energy sources. For example, the production of natural gas, which fuels more than half of U.S. homes, is declining in the United States, Canada, and Mexico as wells are exhausted. In both the United States and Canada, intensive new drilling is being offset by high depletion rates, and gas consumption increases yearly. In 2002 the United States imported 15% of its gas from Canada, more than half of Canada’s total gas production. However, with Canada’s gas production decreasing and with the “stranded” gas reserves in the United States and Canadian Arctic regions unavailable until pipelines are built 5–10 years from now, the United States is likely to become more dependent on imported liquid natural gas (LNG). Here are some facts to consider. Imports of LNG in the United States increased from 39 billion cubic feet in 1990 to 169 billion cubic feet in 2002, which was still <1% of U.S. natural gas consumption. The largest natural gas field in the world is in the tiny Persian Gulf state of Qatar. Gas is liquefied near the site of production by cooling it to −260◦F (−162◦C), shipped in special refrigerated trains to waiting LNG ships, and then transported to an LNG terminal, where it is off-loaded, regasified, and piped to consumers. Each LNG transport ship costs a half billion dollars. An LNG terminal costs one billion dollars. There are four LNG terminals in the United States, none in Canada or Mexico. Approximately 30 additional LNG terminal sites to supply the United States are being investigated or planned, including several in the Bahamas, with pipelines to Florida. On 19 January 2004, the LNG terminal at Skikda, Algeria, blewup with tremendous force, flattening much of the port and killing 30 people. The Skikda terminal, renovated by Halliburton in the late 1990s, will cost $800 million to $1 billion to replace. All major ports in the United States are heavily populated, and there is strong environmental opposition to putting terminals at some sites in the United States. Draw your own conclusions about LNG as a source of cheap energy (Youngquist & Duncan 2003; Romero 2004). From LNG to coal gasification to oil shale to nuclear fission to breeder reactors to fusion to renewable energy, even to improvements in efficiency of energy use (Browne 2004), our society looks from panacea to panacea to feed the ever-increasing demands of globalization. But no one solution or combination of solutions will suffice to meet this kind of consumption. In the words of Vaclav Smil (2003): Perhaps the evolutionary imperative of our species is to ascend a ladder of ever-increasing energy throughputs, never to consider seriously any voluntary consumption limits and stay on this irrational course until it will be too late to salvage the irreplaceable underpinnings of biospheric services that will be degraded and destroyed by our progressing use of energy and materials.

### Growth Bad – Endocrine Disruptors

#### Development is reducing human reproduction capabilities, ensuring eventual extinction

Richard Douthwaite, economist employed by Jamaica and Montserrat, journalist, 1999, in Critical Development Theory, ed. Munck and O’Hearn, p. 158

A third reason that the world economy is unsustainable is that some of the chemicals it employs mimic human hormones and disrupt the body’s endocrine system. As a result, the sperm counts of European men have been falling at 3 per cent per year since these chemicals came into use after the Second World War (Swan a al. 1997). The same chemicals are also causing increases in testicular and breast cancer (European Workshop 1996) and are causing fewer boys to be born relative to girls. Moreover, a higher proportion of these boys than ever before have defective genitals. In short, the world economic system is undermining humanity’s ability to reproduce itself. If the human race is not sustainable then neither is its economic system.

### Yes BD Loss

#### It’s a try or die for the environment, and it’s too late for growth to solve – massive consensus and studies prove

Matthew Knight, Cites the GBO and CBD: The GBO-3 is a landmark study in what is the U.N.'s International Year of Biodiversity and will play a key role in guiding the negotiations between world governments at the U.N. Biodiversity Summit in Nagoya, Japan in October 2010. The CBD -- an international treaty designed to sustain diversity of life on Earth -- was set up at the Earth Summit in Rio de Janeiro in 1992, 5-10-2010, “U.N. report: Eco-systems at 'tipping point'”, http://edition.cnn.com/2010/WORLD/americas/05/10/biodiversity.loss.report/index.html?eref=igoogle\_cnn

The world's eco-systems are at risk of "rapid degradation and collapse" according to a new United Nations report. The third Global Biodiversity Outlook (GBO-3) published by the Convention on Biological Diversity (CBD) warns that unless "swift, radical and creative action" is taken "massive further loss is increasingly likely." Ahmed Djoghlaf, executive secretary of the CBD said in a statement: "The news is not good. We continue to lose biodiversity at a rate never before seen in history." The U.N. warns several eco-systems including the Amazon rainforest, freshwater lakes and rivers and coral reefs are approaching a "tipping point" which, if reached, may see them never recover. The report says that no government has completely met biodiversity targets that were first set out in 2002 -- the year of the first GBO report. Executive Director of the U.N. Environmental Program Achim Steiner said there were key economic reasons why governments had failed in this task. "Many economies remain blind to the huge value of the diversity of animals, plants and other life-forms and their role in healthy and functioning eco-systems," Steiner said in a statement. Although many countries are beginning to factor in "natural capital," Steiner said that this needs "rapid and sustained scaling-up." Despite increases in the size of protected land and coastal areas, biodiversity trends reported in the GBO-3 are almost entirely negative. Vertebrate species fell by nearly one third between 1970 and 2006, natural habitats are in decline, genetic diversity of crops is falling and sixty breeds of livestock have become extinct since 2000. Nick Nuttall, a U.N. Environmental Program spokesman, said the cost of eco-systems degradation is huge. "In terms of land-use change, it's thought that the annual financial loss of services eco-systems provide -- water, storing carbon and soil stabilization -- is about &euro50 billion ($64 billion) a year," Nuttall told CNN. "If this continues we may well see by 2050 a cumulative loss of what you might call land-based natural capital of around &euro95 trillion ($121 trillion)," he said.

### Biodiversity Theory True

#### Biodiversity loss is accelerating and causes global extinction – their studies ignore long term effects

David Biello, staff writer, 5-3-2012, “How Biodiversity Keeps Earth Alive,” Scientific American, http://www.scientificamerican.com/article.cfm?id=how-biodiversity-keeps-earth-alive

"Different species differ in how, when and where they acquire water, nutrients and carbon, and maintain them in the ecosystem. Thus, when many species grow together, they have a wider set of traits that allow them to gain the resources needed," explains ecologist Peter Reich of the University of Minnesota, who led this research to be published in Science on May 4. This result suggests "no level of diversity loss can occur without adverse effects on ecosystem functioning." That is the reverse of what numerous studies had previously found, largely because those studies only looked at short-term outcomes. The planet as a whole is on the cusp of what some researchers have termed the sixth mass extinction event in the planet's history: the wiping out of plants, animals and all other forms of life due to human activity. The global impact of such biodiversity loss is detailed in a meta-analysis led by biologist David Hooper of Western Washington University. His team examined 192 studies that looked at species richness and its effect on ecosystems. "The primary drivers of biodiversity loss are, in rough order of impact to date: habitat loss, overharvesting, invasive species, pollution and climate change," Hooper explains. Perhaps unsurprisingly, "biodiversity loss in the 21st century could rank among the major drivers of ecosystem change," Hooper and his colleagues wrote in Nature on May 3. (Scientific American is part of Nature Publishing Group.) Losing just 21 percent of the species in a given ecosystem can reduce the total amount of biomass in that ecosystem by as much as 10 percent—and that's likely to be a conservative estimate. And when more than 40 percent of an ecosystem's species disappear—whether plant, animal, insect, fungi or microbe—the effects can be as significant as those caused by a major drought. Nor does this analysis take into account how species extinction can both be driven by and act in concert with other changes—whether warmer average temperatures or nitrogen pollution. In the real world environmental and biological changes "are likely to be happening at the same time," Hooper admits. "This is a critical need for future research." The major driver of human impacts on the rest of life on this planet—whether through clearing forests or dumping excess fertilizer on fields—is our need for food. Maintaining high biomass from farming ecosystems, which often emphasize monocultures (single species) while also preserving biodiversity—some species now appear only on farmland—has become a "key issue for sustainability," Hooper notes, "if we're going to grow food for nine billion people on the planet in the next 40 to 50 years." Over the long term, maintaining soil fertility may require nurturing, creating and sparing plant and microbial diversity. After all, biodiversity itself appears to control the elemental cycles—carbon, nitrogen, water—that allow the planet to support life. Only by acting in conjunction with one another, for example, can a set of grassland plant species maintain healthy levels of nitrogen in both soil and leaf. "As soil fertility increases, this directly boosts biomass production," just as in agriculture, Reich notes. "When we reduce diversity in the landscape—think of a cornfield or a pine plantation or a suburban lawn—we are failing to capitalize on the valuable natural services that biodiversity provides." At least one of those services is largely unaffected, however, according to Hooper's study—decomposition. Which means the bacteria and fungi will still happily break down whatever plants are left after this sixth extinction. But thousands of unique species have already been lost, most unknown even to science—a rate that could halve the total number of species on the planet by 2100, according to entomologist E. O. Wilson of Harvard University. Ghosts of species past haunt ecosystems worldwide, which have already lost not just one or another type of grass or roundworm but also some of their strength at sustaining life as a whole.

### Yes Tipping Point

#### Now is critical—the aff is too long term

David Ulansey, Professor of Philosophy and Religion, Ph.D. From Princeton, 2006, “The Impending Mass Extinction and How to Stop It”, http://www.energybulletin.net/node/23694

My talk at the Be-In will be about the fact that the world's biologists and ecologists have reached a consensus that UNLESS humanity immediately halts its dismantling of the natural world-- through habitat destruction, pollution, invasive species, and climate change-- half of all species of life on earth will be extinct in less than 100 years. In fact, as scientists are learning more about climate change, the expected time frame of the mass extinction is rapidly shrinking, and estimates are now coming in that half of all species will be extinct in 35 to 50 years. This means that WE DON'T HAVE 35 YEARS to solve the problem, since by then it will be FAR past the point of no return. The reality is that to prevent the looming mass extinction, a critical mass of humanity must undergo a radical transformation in its behavior within the next 5 TO 10 YEARS. Of course this sounds impossible-- but so in their time did the fall of the Soviet Union, or the birth of new religions like Christianity or Buddhism!

### AT: Growth Good – Kuznets Curve

#### Growth only creates demand for end of pipe environmental solutions. Disproves Kuznets’ thesis

Thomas Homer-Dixon, holds the Centre for International Governance Innovation Chair of Global Systems at the Balsillie School of International Affairs in Waterloo, Ontario, and is a Professor in the Centre for Environment and Business in the Faculty of Environment, University of Waterloo, 6-8-2009, “The Great Transformation: Climate Change as Cultural Change,” http://www.homerdixon.com/2009/06/08/the-great-transformation-climate-change-as-cultural-change/

Internalizing such externalities will be an essential part of our coming economic transition. But another part of this transition is discussed far less – and that’s a shift to a steady-state world economy. Yet this shift, which will include efforts to enhance systemic resilience, must be a fundamental part of the cultural transformation that you’re considering at this conference. I’ll explain what I mean. I am going to be controversial: There is a common argument, which often comes under the label of the “environmental Kuznets curve,” that as poor societies become wealthier (conventionally, as their aggregated GDP increases) the amount of damage they cause to the environment at first increases and then at some point starts to decrease (see Figure 2). Figure 2. When we look at the historical data for wealthy countries in Europe, North America, and Asia, this “inverted U” relationship indeed holds for certain pollutants such as sulfur dioxide and lead. But if we examine data for what I think is the best proxy measure of total human load on the environment – carbon dioxide output – the relationship looks more like that shown in Figure 3. For any modern economy in aggregate, as wealth has increased total carbon dioxide output has increased steadily too – maybe not as fast as wealth has increased, but still significantly nonetheless. When we look at the data for carbon dioxide, we don’t see anything approximating an environmental Kuznets curve. Figure 3. So, what is going on here? Why is it that we commonly hear one story from conservative economists about the environmental Kuznets curve and yet observe another story when we examine CO2 output? I believe that the missing part of the story is economic growth. As our economies grew fast in rich countries in the 1960s, 70s and 80s, we invested in end-of-pipe environmental solutions: We cleaned up our power plants, our sewage outfalls, and to a large extent the emissions from our car tail pipes. But this was just the visible stuff – the stuff that was accumulating in our cities’ air, that we could see in our streams, rivers and lakes, and that was palpable to people. As citizens became wealthier in our democracies, and as they started to be concerned about their natural environment, they turned to their politicians and said: “Fix this mess. It could be making us sick. We don’t like the look of it. It smells. Clean it up.” In almost all cases, the end-of-pipe solutions that our societies adopted involved higher energy consumption, and because most of our energy comes from fossil fuels, higher energy consumption meant higher carbon dioxide output. For instance, the catalytic converters we plugged onto the ends of our car tail pipes lowered our cars’ overall gas mileage. We had cleaner urban skies but emitted more CO2. Still, rich countries managed to improve their efficiency quite remarkably over this period of time – efficiency defined in terms of the amount of energy or material used per dollar of GDP. Rates of improvement of two percent a year were common. Over a period of thirty years, these improvements added up to a very substantial change. Between 1970 and 2000, rich countries saw gains in many cases of 40 percent or more in material and energy efficiency. But economic growth swamped all these improvements, which meant that these societies’ total environmental impact, if we use a measure like total emissions of carbon dioxide, steadily increased. Efficiency improvements of 2 percent a year were overwhelmed by real economic growth of 3 percent a year or more. And because we got rid of all the visible problems – the visible pollution in our rivers and our streams and our lakes and the pollution in the air over our cities – we couldn’t see the extra environmental load we were putting on the environment and on the planet. We had transferred our load beyond the horizon in time and space. The people who will pay a price for our increased carbon dioxide output are elsewhere on the planet or elsewhere in time – like our children and children’s children in the future. So we need to ask: Why are we so deeply committed to economic growth? Here we come to some profound cultural issues. We have internalized four equivalencies in our cultures and our societies, in part because they are backed by a fair amount of evidence. 1. Growth equals solvency. After the Second World War, all the deeply indebted countries that had fought that war grew out of their debt. In the same way, we often use growth to ease the burden of household debt: if our household incomes and wealth rise over time, our debt becomes a smaller proportion of that wealth, and payments on the debt a smaller fraction of income. We maintain the putative solvency of our pension funds by assuming that economic growth will allow us to meet these funds’ obligations in the future. In all kinds of ways, both explicitly and implicitly, we associate growth with maintaining solvency over time. 2. Growth equals freedom. This equivalency probably dates back as far as the Renaissance with the development of modern notions of social, intellectual, and scientific progress. It became even more deeply embedded in Western cultures during the Enlightenment. Today, some conservative economists, such as Benjamin Friedman at Harvard University, cogently argue that the only way we can be truly free is to live within societies that experience continual economic growth. 3. Growth equals happiness. There’s an association in our minds between wealth and happiness: if we get wealthier, we’re happier. Researchers argue about whether this relationship actually holds. The evidence is interesting and complex, but there’s enough of it to support the claim that there is – especially at lower incomes – a strong correlation between wealth and happiness. Beyond a level of around 20.000 dollars per year per capita the relationship likely starts to weaken, as every extra dollar of income produces diminishing returns (that is, as people’s basic needs are satisfied). And then there’s what I believe is the most persuasive and culturally powerful equivalency. 4. Growth equals peace. This is a lesson we learned in the 1930s: an economic collapse leads to the rise of political extremism and horrible outcomes like the Second World War. John Maynard Keynes understood this relationship and gave us tools to maintain perpetual economic growth. How ironic that the man regarded by many people on the left as the icon of liberal economists gave us the tools to destroy the planet’s environment. And today in this time of economic crisis, the world’s central bankers and policy makers are using every single Keynesian tool in their tool kit to sustain consumption. It seems that the only way we can reduce humankinds’ load on the natural environment is to have an economic collapse. We need an alternative to economic growth that addresses these four real equivalencies. It’s a cultural challenge because these equivalencies are deeply embedded cultural assumptions backed by lots of empirical evidence and historical experience. This cultural change won’t come easily. When we move this century to a steady-state economy – as we will – we will need to have a clear sense for where we’re going. In other words, we will need to know that we can maintain our solvency, happiness, freedom, and peace even though we don´t grow. Keep in mind that about fifty percent of the human population lives on 2 dollars a day or less. For them economic growth is absolutely central and essential. It can mean the difference between life and death. A steady-state global economy doesn’t have to be one in which no one is growing. But if some parts of that economy are growing, other won’t be – they may even have to shrink. Fundamentally, a redistribution of wealth, income, and opportunity for growth is essential within the world economy. So the climate problem – because it’s linked to growth – is ultimately a problem of planetary equity, an issue that’s rarely discussed. It’s ultimately a problem of our world’s enormous gaps between rich and poor. John Kenneth Galbraith, the late American economist, noted that growth is the best lubricant between rich and poor. If we don’t put in place alternatives and our global economic growth comes to an involuntary halt, perhaps because of the increasing damage caused by climate change and energy scarcity later this century, rich and poor will be at each other’s throats, both within our societies and around the world. What’s the alternative? Whatever the alternative, I expect it will involve the notion of resilience. My thinking here is grounded in the ideas of Buzz Holling, a renowned Canadian ecologist. Resilient people, institutions, and societies can withstand shocks without catastrophic failure. In a complex, tightly coupled world exhibiting increasingly frequent and severe system shock, the balance of economic and social investment, I argue, should go towards increasing resilience rather than towards increasing efficiency, productivity, and growth. In the future, we will see many instabilities and crises. These moments can be opportunities for deep change in behaviors, cultures and technologies, but only if we make sure that things don´t fall apart when they occur. Resilience is an essential feature of a world that is able to adjust effectively to crises and exploit the opportunity for real change they present.

### AT: Growth Good – Decoupling

#### Decoupling emission from growth is impossible – special interests benefit too much for the status quo to alter their behaviors

Gareth Dale, Director of Postgraduate Research Politics and History, Brunel University, 3-27-2012, “The growth paradigm: a critique,” International Socialism, Issue 134, http://www.isj.org.uk/index.php4?id=798&issue=134

Taken together, these arguments suggest that capitalism is locked into a growth drive that is undermining its conditions of existence. Capitalism is, in James Anderson’s pithy phrase, “uniquely dynamic in producing ecological problems and uniquely unsuited to solving them”.93 But is there any wiggle room? In a recent book Max Koch makes the case that the political management of environmental issues such as climate change does not simply reflect the “logic of capital” but is constructed politically.94 The global ecological crisis does not primarily emanate from the mode of production but is an “institutional crisis of the appropriation of nature by society”. The institutions Koch targets are those that support the contemporary “’finance-driven’ accumulation regime” and which undermine the state’s role as administrator of public goods.95 A “new growth period” is perfectly conceivable, with GDP growth decoupled from greenhouse gas emissions.96 This would, he maintains, require a new geopolitical regime, with the “establishment of international institutions (not unlike the Bretton Woods institutions after the Second World War) powerful enough to limit and steer capital valorisation in accordance with ecological laws”.97 Koch’s argument is well made but is not without flaws. One is that he fails to trace in sufficient detail the links between the mode of production, capitalism, and its specific institutional arrangements. Related to this is his underestimation of the power of vested interests. The historical record brims with examples of civilisations that have succumbed to ecological collapse, and in each case the entrenched interests of elites form a colossal obstacle to progressive change. The concentration of power at the top of class societies, as Ronald Wright has put it in his survey of pre-capitalist ecological catastrophes, “gives the elite a vested interest in the status quo; they continue to prosper in darkening times long after the environment and general populace begin to suffer”.98 In our era the same applies. At the most general level the vested interests include the capitalist class as a whole, with particular culprits being fossil fuel and energy-intensive corporations—the owners of fixed capital that would be devalued in a transition to a low-carbon economy. Koch does not sufficiently consider how these interests can be challenged, and neglects questions of political agency. He does not elaborate a politics of ecological transition, presenting it instead in blueprint form—a template for a desirable institutional transformation. In short, he doesn’t get to grips with the question of what form, concretely, the transition to his anticipated social democratic eco-capitalism would take.

### AT: Growth Good – Decoupling

#### Decoupling confuses absolute and relative declines in resource depletion and history

Tim Jackson, Prof of Econ at University of Surrey, 3-30-2009, “Prosperity without Growth,” Sustainable Development Commission, http://www.sd-commission.org.uk/data/files/publications/pwg\_summary\_eng.pdf

The conventional response to the dilemma of growth is to call for ‘decoupling’: continued economic growth with continually declining material throughput. Since efficiency is one of the things that modern capitalist economies are supposed to be good at, decoupling has a familiar logic and a clear appeal as a solution to the dilemma of growth. As Chapter 5 points out, it’s vital to distinguish between ‘relative’ and ‘absolute’ decoupling. Relative decoupling refers to a situation where resource impacts decline relative to the GDP. Impacts may still rise, but they do so more slowly than the GDP. The situation in which resource impacts decline in absolute terms is called ‘absolute decoupling’. Needless to say, this latter situation is essential if economic activity is to remain within ecological limits. Evidence for declining resource intensities (relative decoupling) is relatively easy to identify. The energy required to produce a unit of economic output declined by a third in the last thirty years, for instance. Global carbon intensity fell from around one kilo per dollar of economic activity to just under 770 grams per dollar. Evidence for overall reductions in resource throughput (absolute decoupling) is much harder to find. The improvements in energy (and carbon) intensity noted above were offset by increases in the scale of economic activity over the same period. Global carbon emissions from energy use have increased by 40% since only 1990 (the Kyoto base year). There are rising global trends in a number of other resources – a range of different metals and several non-metallic minerals for example. Worryingly, in some cases, even relative decoupling isn’t happening. Resource productivity in the use of some structural materials (iron ore, bauxite, cement) has been declining globally since 2000, as the emerging economies build up physical infrastructures, leading to accelerating resource throughput. The scale of improvement required is daunting. In a world of nine billion people, all aspiring to a level of income commensurate with 2% growth on the average EU income today, carbon intensities (for example) would have to fall on average by over 11% per year to stabilise the climate, 16 times faster than it has done since 1990. By 2050, the global carbon intensity would need to be only six grams per dollar of output, almost 130 times lower than it is today. Substantial economic investment will be needed to achieve anything close to these improvements. Lord Stern has argued that stabilising atmospheric carbon at 500 parts per million (ppm) would mean investing 2% of GDP each year in carbon emission reductions. Achieving 450 ppm stabilisation would require even higher levels of investment. Factor in the wider capital needs for resource efficiency, material and process substitution and ecological protection and the sheer scale of investment becomes an issue. The macro-economic implications of this are addressed in Chapter 8. More to the point, there is little attempt in existing scenarios to achieve an equitable distribution of incomes across nations. Unless growth in the richer nations is curtailed, the ecological implications of a truly shared prosperity become even more daunting to contemplate. The truth is that there is as yet no credible, socially just, ecologically sustainable scenario of continually growing incomes for a world of nine billion people. In this context, simplistic assumptions that capitalism’s propensity for efficiency will allow us to stabilise the climate and protect against resource scarcity are nothing short of delusional. Those who promote decoupling as an escape route from the dilemma of growth need to take a closer look at the historical evidence – and at the basic arithmetic of growth.

### AT: Growth Good – Decoupling

#### Growth is mutually exclusive with sustainability – if there is any connection, environmental collapse is inevitable

Minqi Li, Assistant Professor Department of Economics, University of Utah, 2009, “Capitalism, Climate Change and the Transition to Sustainability: Alternative Scenarios for the US, China and the World”, Development and Change, http://www.econ.utah.edu/~mli/CV/Development%20and%20Change%201209.pdf

It is no coincidence that modern economic growth (the kind of economic growth that takes place at exponential rates and seems to go on indefinitely) has taken place only in the capitalist era. Capitalism is a social system in which society’s surplus product (the total product minus what is necessary to meet the population’s basic needs) is controlled by a privileged minority that forms the ruling class. Capitalism is unlike all previous societies; it is the only social system so far in which market relations are pervasive and dominant in the economic and social life of the society. When market relations are pervasive and dominant — so that virtually every aspect of economic and social life can be measured and valued by money — individual capitalists, businesses and states are under constant and intense pressure to compete against one another. Those who fail in this market competition will cease to exist as capitalists. To survive and prevail in competition, each capitalist, business or state is compelled to use a substantial portion of the surplus product at its disposal (proﬁts or taxes) to engage in capital accumulation. As a result, under capitalism, there has been a systematic tendency for population, production and consumption expand on increasingly larger scales. Even today, this is still considered by many as the primary virtue of capitalism. To achieve ecological sustainability, human impact on the ecological system in all its dimensions must stabilize at levels within the system’s natural operative capacity. Theoretically, economic growth may be made compatible with ecological sustainability if ecological technological progress can proceed sufﬁciently rapidly so that environmental impact per unit of economic output falls more rapidly than economic output grows. Technological optimists, such as Hawken et al. (1999) and Brown (2008), argue that through massive reductions of material and energy throughputs per unit of economic output, ecological sustainability can be achieved without undermining economic growth and material prosperity. However, in reality, it is impossible for human economic activities to have zero impact on the environment. As long as the environmental impact per unit of economic output remains positive and does not approach zero, an inﬁnitely growing economy will sooner or later lead to an environmental impact on an increasingly large scale, and will violate the requirements of ecological sustainability (Huesemann, 2003; Trainer, 2001). More importantly, the arguments of the technological optimists fail to take into account the political, technological and environmental realities within which global capitalist accumulation has taken place. First, the capitalist world system is based on inter-state competition. The inevitable conﬂicts of interests between nation states and the constant pressure for them to pursue national capital accumulation make it very difﬁcult, and in the case of climate stabilization nearly impossible, for global environmental regulation to function effectively. Second, the existing physical and technical infrastructure of the global capitalist economy is based on non-renewable resources and ecologically unsustainable technologies. Even if economic growth can be made compatible with sustainability under idealized technological conditions, it would nevertheless take several decades to replace the existing infrastructure with a new, ecologically sustainable infrastructure. However, the global environmental crisis (and especially the climate change crisis) is now developing so rapidly that the global ecological system is literally on the verge of collapse. Thus, as long as the global economy continues to be organized in accordance with capitalist principles committed to endless economic growth, there is virtually no hope that ecological catastrophes can be averted.

### AT: Growth Good – Tech

#### Rebound effect of increased consumption means resource depletion accelerates with improvements in technology

David Owen, staff writer, 12-27-2010, “The Efficiency Dilemma,” The New Yorker.

The environmentalist Amory Lovins, whose thinking has influenced Chu’s, has referred to the replacement of incandescent light bulbs with compact fluorescents as “not a free lunch, but a lunch you’re paid to eat,” since a fluorescent bulb will usually save enough electricity to more than offset its higher purchase price. Tantalizingly, much of the technology required to increase efficiency is well understood. The World Economic Forum, in a report called “Towards a More Energy Efficient World,” observed that “the average refrigerator sold in the United States today uses three-quarters less energy than the 1975 average, even though it is 20% larger and costs 60% less”—an improvement that Chu cited in his conversation with me. But the issue may be less straight-forward than it seems. The thirty-five-year period during which new refrigerators have plunged in electricity use is also a period during which the global market for refrigeration has burgeoned and the world’s total energy consumption and carbon output, including the parts directly attributable to keeping things cold, have climbed. Similarly, the first fuel-economy regulations for U.S. cars—which were enacted in 1975, in response to the Arab oil embargo— were followed not by a steady decline in total U.S. motor-fuel consumption but by a long-term rise, as well as by increases in horsepower, curb weight, vehicle miles travelled (up a hundred per cent since 1980), and car ownership (America has about fifty million more registered vehicles than licensed drivers). A growing group of economists and others have argued that such correlations aren’t coincidental. Instead, they have said, efforts to improve energy efficiency can more than negate any environmental gains—an idea that was first proposed a hundred and fifty years ago, and which came to be known as the Jevons paradox. Great Britain in the middle of the nineteenth century was the world’s leading military, industrial, and mercantile power. In 1865, a twenty-nine year-old Englishman named William Stanley Jevons published a book, “The Coal Question,” in which he argued that the bonanza couldn’t last. Britain’s affluence, he wrote, depended on its endowment of coal, which the country was rapidly depleting. He added that such an outcome could not be delayed through increased “economy” in the use of coal—what we refer to today as energy efficiency. He concluded, in italics, “It is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption. The very contrary is the truth.” He offered the example of the British iron industry. If some technological advance made it possible for a blast furnace to produce iron with less coal, he wrote, then profits would rise, new investment in iron production would be attracted, and the price of iron would fall, thereby stimulating additional demand. Eventually, he concluded, “the greater number of furnaces will more than make up for the diminished consumption of each.” Other examples of this effect abound. In a paper published in 1998, the Yale economist William D. Nordhaus estimated the cost of lighting throughout human history. An ancient Babylonian, he calculated, needed to work more than forty-one hours to acquire enough lamp oil to provide a thousand lumen-hours of light—the equivalent of a seventy-five-watt incandescent bulb burning for about an hour. Thirty-five hundred years later, a contemporary of Thomas Jefferson’s could buy the same amount of illumination, in the form of tallow candles, by working for about five hours and twenty minutes. By 1992, an average American, with access to compact fluorescents, could do the same in less than half a second. Increasing the energy efficiency of illumination is nothing new; improved lighting has been “a lunch you’re paid to eat” ever since humans upgraded from cave fires (fifty-eight hours of labor for our early Stone Age ancestors). Yet our efficiency gains haven’t reduced the energy we expend on illumination or shrunk our energy consumption over all. On the contrary, we now generate light so extravagantly that darkness itself is spoken of as an endangered natural resource. Jevons was born in Liverpool in 1835. He spent two years at University College, in London, then went to Australia, where he had been offered a job as an assayer at a new mint, in Sydney. He left after five years, completed his education in England, became a part-time college instructor, and published a well-received book on gold markets. “The Coal Question” made him a minor celebrity; it was admired by John Stuart Mill and William Gladstone, and it inspired the government to investigate his findings. In 1871, he published “The Theory of Political Economy,” a book that’s still considered one of the founding texts of mathematical economics. He drowned a decade later, at the age of forty-six, while swimming in the English Channel. In 1905, John Maynard Keynes, who was then twenty-two and a graduate student at Cambridge University, wrote to Lytton Strachey that he had discovered a “thrilling” book: Jevons’s “Investigations in Currency and Finance.” Keynes wrote of Jevons, “I am convinced that he was one of the minds of the century.” Jevons might be little discussed today, except by historians of economics, if it weren’t for the scholarship of another English economist, Len Brookes. During the nineteen-seventies oil crisis, Brookes argued that devising ways to produce goods with less oil—an obvious response to higher prices—would merely accommodate the new prices, causing energy consumption to be higher than it would have been if no effort to increase efficiency had been made; only later did he discover that Jevons had anticipated him by more than a century. I spoke with Brookes recently. He told me, “Jevons is very simple. When we talk about increasing energy efficiency, what we’re really talking about is increasing the productivity of energy. And, if you increase the productivity of anything, you have the effect of reducing its implicit price, because you get more return for the same money— which means the demand goes up.” Nowadays, this effect is usually referred to as “rebound”—or, in cases where increased consumption more than cancels out any energy savings, as “backfire.” In a 1992 paper, Harry D. Saunders, an American researcher, provided a concise statement of the basic idea: “With fixed real energy price, energy efficiency gains will increase energy consumption above where it would be without these gains.” In 2000, the journal Energy Policy devoted an entire issue to rebound. It was edited by Lee Schipper, who is now a senior research engineer at Stanford University’s Precourt Energy Efficiency Center. In an editorial, Schipper wrote that the question was not whether rebound exists but, rather, “how much the effect appears, how rapidly, in which sectors, and in what manifestations.” The majority of the Energy Policy contributors concluded that there wasn’t a lot to worry about. Schipper, in his editorial, wrote that the articles, taken together, suggested that “rebounds are significant but do not threaten to rob society of most of the benefits of energy efficiency improvements.” I spoke with Schipper recently, and he told me that the Jevons paradox has limited applicability today. “The key to understanding Jevons,” he said, “is that processes, products, and activities where energy is a very high part of the cost—in this country, a few metals, a few chemicals, air travel—are the only ones whose variable cost is very sensitive to energy. That’s it.” Jevons wasn’t wrong about nineteenth-century British iron smelting, he said; but the young and rapidly growing industrial world that Jevons lived in no longer exists. Most economists and efficiency experts have come to similar conclusions. For example, some of them say that when you increase the fuel efficiency of cars you lose no more than about ten per cent of the fuel savings to increased use. And if you look at the whole economy, Schipper said, rebound effects are comparably trivial. “People like Brookes would say—they don’t quite know how to say it, but they seem to want to say the extra growth is more than the saved energy, so it’s like a backfire. The problem is, that’s never been observed on a national level.” But troublesome questions have lingered, and the existence of large-scale rebound effects is not so easy to dismiss. In 2004, a committee of the House of Lords invited a number of experts to help it grapple with a conundrum: the United Kingdom, like a number of other countries, had spent heavily to increase energy efficiency in an attempt to reduce its greenhouse emissions. Yet energy consumption and carbon output in Britain— as in the rest of the world—had continued to rise. Why? Most economic analyses of rebound focus narrowly on particular uses or categories of uses: if people buy a more efficient clothes dryer, say, what will happen to the energy they use as they dry clothes? (At least one such study has concluded that, for appliances in general, rebound is nonexistent.) Brookes dismisses such “bottom-up” studies, because they ignore or understate the real consumption effects, in economies as a whole. A good way to see this is to think about refrigerators, the very appliances that the World Economic Forum and Steven Chu cited as efficiency role models for reductions in energy use. The first refrigerator I remember is the one my parents owned when I was little. They acquired it when they bought their first house, in 1954, a year before I was born. It had a tiny, uninsulated freezer compartment, which seldom contained much more than a few aluminum ice trays and a burrow-like mantle of frost. (Frost-free freezers stay frost-free by periodically heating their cooling elements—a trick that wasn’t widely in use yet.) In the sixties, my parents bought a much improved model—which presumably was more efficient, since the door closed tight, by means of a rubberized magnetic seal rather than a mechanical latch. But our power consumption didn’t fall, because the old refrigerator didn’t go out of service; it moved into our basement, where it remained plugged in for a further twenty-five years—mostly as a warehouse for beverages and leftovers—and where it was soon joined by a stand-alone freezer. Also, in the eighties, my father added an ice-maker to his bar, to supplement the one in the kitchen fridge. This escalation of cooling capacity has occurred all over suburban America. The recently remodelled kitchen of a friend of mine contains an enormous side-by-side refrigerator, and a drawer-like under-counter mini-fridge for beverages. And the trend has not been confined to households. As the ability to efficiently and inexpensively chill things has grown, so have opportunities to buy chilled things—a potent positive-feedback loop. Gas stations now often have almost as much refrigerated shelf space as the grocery stores of my early childhood; even mediocre hotel rooms usually come with their own small fridge (which, typically, either is empty or—if it’s a minibar—contains mainly things that don’t need to be kept cold), in addition to an icemaker and a refrigerated vending machine down the hall. The steadily declining cost of refrigeration has made eating much more interesting. It has also made almost all elements of food production more cost-effective and energy-efficient: milk lasts longer if you don’t have to keep it in a pail in your well. But there are environmental downsides, beyond the obvious one that most of the electricity that powers the world’s refrigerators is generated by burning fossil fuels. James McWilliams, who is the author of the recent book “Just Food,” told me, “Refrigeration and packaging convey to the consumer a sense that what we buy will last longer than it does. Thus, we buy enough stuff to fill our capacious Sub-Zeros and, before we know it, a third of it is past its due date and we toss it.” (The item that New Yorkers most often throw away unused, according to the anthropologist-in-residence at the city’s Department of Sanitation, is vegetables.) Jonathan Bloom, who runs the Web site wastedfood.com and is the author of the new book “American Wasteland,” told me that, since the mid-nineteen-seventies, per-capita food waste in the United States has increased by half, so that we now throw away forty per cent of all the edible food we produce. And when we throw away food we don’t just throw away nutrients; we also throw away the energy we used in keeping it cold as we lost interest in it, as well as the energy that went into growing, harvesting, processing, and transporting it, along with its proportional share of our staggering national consumption of fertilizer, pesticides, irrigation water, packaging, and landfill capacity. According to a 2009 study, more than a quarter of U.S. freshwater use goes into producing food that is later discarded. Efficiency improvements push down costs at every level—from the mining of raw materials to the fabrication and transportation of finished goods to the frequency and intensity of actual use— and reduced costs stimulate increased consumption. (Coincidentally or not, the growth of American refrigerator volume has been roughly paralleled by the growth of American body-mass index.) Efficiency-related increases in one category, furthermore, spill into others. Refrigerators are the fraternal twins of air-conditioners, which use the same energy-hungry compressor technology to force heat to do something that nature doesn’t want it to. When I was a child, cold air was a far greater luxury than cold groceries. My parents’ first house—like eighty-eight per cent of all American homes in 1960—didn’t have air-conditioning when they bought it, although they broke down and got a window unit during a heat wave, when my mom was pregnant with me. Their second house had central air-conditioning, but running it seemed so expensive to my father that, for years, he could seldom be persuaded to turn it on, even at the height of a Kansas City summer, when the air was so humid that it felt like a swimmable liquid. Then he replaced our ancient Carrier unit with a modern one, which consumed less electricity, and our house, like most American houses, evolved rapidly from being essentially un-air-conditioned to being air-conditioned all summer long. Modern air-conditioners, like modern refrigerators, are vastly more energy efficient than their mid-twentieth-century predecessors—in both cases, partly because of tighter standards established by the Department of Energy. But that efficiency has driven down their cost of operation, and manufacturing efficiencies and market growth have driven down the cost of production, to such an extent that the ownership percentage of 1960 has now flipped: by 2005, according to the Energy Information Administration, eighty-four per cent of all U.S. homes had air-conditioning, and most of it was central. Stan Cox, who is the author of the recent book “Losing Our Cool,” told me that, between 1993 and 2005, “the energy efficiency of residential air-conditioning equipment improved twenty-eight per cent, but energy consumption for A.C. by the average air-conditioned household rose thirty-seven per cent.” One consequence, Cox observes, is that, in the United States, we now use roughly as much electricity to cool buildings as we did for all purposes in 1955. As “Losing Our Cool” clearly shows, similar rebound effects permeate the economy. The same technological gains that have propelled the growth of U.S. residential and commercial cooling have helped turn automobile air-conditioners, which barely existed in the nineteen-fifties, into standard equipment on even the least luxurious vehicles. (According to the National Renewable Energy Laboratory, running a mid-sized car’s air-conditioning increases fuel consumption by more than twenty per cent.) And access to cooled air is self-reinforcing: to someone who works in an air-conditioned office, an un-air-conditioned house quickly becomes intolerable, and vice versa. A resident of Las Vegas once described cars to me as “devices for transporting air-conditioning between buildings.” In less than half a century, increased efficiency and declining prices have helped to push access to air-conditioning almost all the way to the bottom of the U.S. income scale—and now those same forces are accelerating its spread all over the world. According to Cox, between 1997 and 2007 the use of air-conditioners tripled in China (where a third of the world’s units are now manufactured, and where many air-conditioner purchases have been subsidized by the government). In India, air-conditioning is projected to increase almost tenfold between 2005 and 2020; according to a 2009 study, it accounted for forty per cent of the electricity consumed in metropolitan Mumbai. All such increases in energy-consuming activity can be considered manifestations of the Jevons paradox. Teasing out the precise contribution of a particular efficiency improvement isn’t just difficult, however; it may be impossible, because the endlessly ramifying network of interconnections is too complex to yield readily to empirical, mathematics-based analysis. Most modern studies of energy rebound are “bottom-up” by necessity: it’s only at the micro end of the economics spectrum that the number of mathematical variables can be kept manageable. But looking for rebound only in individual consumer goods, or in closely cropped economic snapshots, is as futile and misleading as trying to analyze the global climate with a single thermometer. Schipper told me, “In the end, the impact of rebound is small, in my view, for one very key reason: energy is a small share of the economy. If sixty per cent of our economy were paying for energy, then anything that moved it down by ten per cent would liberate a huge amount of resources. Instead, it’s between six and eight per cent for primary energy, depending on exactly what country you’re in.” (“Primary energy” is the energy in oil, coal, wind, and other natural resources before it’s been converted into electricity or into refined or synthetic fuels.) Schipper believes that cheap energy is an environmental problem, but he also believes that, because we can extract vastly more economic benefit from a ton of coal than nineteenth-century Britons did, efficiency gains now have much less power to stimulate consumption. This concept is closely related to one called “decoupling,” which suggests that the growing efficiency of machines has weakened the link between energy use and economic activity, and also to the idea of “decarbonization,” which holds that, for similar reasons, every dollar we spend represents a shrinking quantity of greenhouse gas. These sound like environmentally valuable trends—yet they seem to imply that the world’s energy and carbon challenges are gradually solving themselves, since decoupling and decarbonization, like increases in efficiency, are nothing new. One problem with decoupling, as the concept is often applied, is that it doesn’t account for energy use and carbon emissions that have not been eliminated but merely exported out of the region under study (say, from California to a factory in China). And there’s a more fundamental problem, described by the Danish researcher Jørgen S. Nørgård, who has called energy decoupling “largely a statistical delusion.” To say that energy’s economic role is shrinking is a little like saying, “I have sixteen great-great-grandparents, eight great-grandparents, four grandparents, and two parents—the world’s population must be imploding.” Energy production may account for only a small percentage of our economy, but its falling share of G.D.P. has made it more important, not less, since every kilowatt we generate supports an ever larger proportion of our well-being. The logic misstep is apparent if you imagine eliminating primary energy from the world. If you do that, you don’t end up losing “between six and eight per cent” of current economic activity, as Schipper’s formulation might suggest; you lose almost everything we think of as modern life. Blake Alcott, an ecological economist, has made a similar case in support of the existence of large-scale Jevons effects. Recently, he told me, “If it is true that greater efficiency in using a resource means less consumption of it—as efficiency environmentalists say— then less efficiency would logically mean more consumption. But this yields a reductio ad absurdum: engines and smelters in James Watt’s time, around 1800, were far less efficient than today’s, but is it really imaginable that, had technology been frozen at that efficiency level, a greater population would now be using vastly more fossil fuel than we in fact do?” Contrary to the argument made by “decouplers,” we aren’t gradually reducing our dependence on energy; rather, we are finding ever more ingenious ways to leverage B.T.U.s. Between 1984 and 2005, American electricity production grew by about sixty-six per cent—and it did so despite steady, economy-wide gains in energy efficiency. The increase was partly the result of population growth; but per-capita energy consumption rose, too, and it did so even though energy use per dollar of G.D.P. fell by roughly half. Besides, population growth itself can be a Jevons effect: the more efficient we become, the more people we can sustain; the more people we sustain, the more energy we consume. The Model T was manufactured between 1908 and 1927. According to the Ford Motor Company, its fuel economy ranged between thirteen and twenty-one miles per gallon. There are vehicles on the road today that do worse than that; have we really made so little progress in more than a hundred years? But focussing on miles per gallon is the wrong way to assess the environmental impact of cars. Far more revealing is to consider the productivity of driving. Today, in contrast to the early nineteen-hundreds, any American with a license can cheaply travel almost anywhere, in almost any weather, in extraordinary comfort; can drive for thousands of miles with no maintenance other than refueling; can easily find gas, food, lodging, and just about anything else within a short distance of almost any road; and can order and eat meals without undoing a seat belt or turning off the ceiling-mounted DVD player. A modern driver, in other words, gets vastly more benefit from a gallon of gasoline—makes far more economical use of fuel—than any Model T owner ever did. Yet motorists’ energy consumption has grown by mind-boggling amounts, and, as the productivity of driving has increased and the cost of getting around has fallen, the global market for cars has surged. (Two of the biggest road-building efforts in the history of the world are currently under way in India and China.) And developing small, inexpensive vehicles that get a hundred miles to the gallon would only exacerbate that trend. The problem with efficiency gains is that we inevitably reinvest them in additional consumption. Paving roads reduces rolling friction, thereby boosting miles per gallon, but it also makes distant destinations seem closer, thereby enabling people to live in sprawling, energy-gobbling subdivisions far from where they work and shop. Chu has said that drivers who buy more efficient cars can expect to save thousands of dollars in fuel costs; but, unless those drivers shred the money and add it to a compost heap, the environment is unlikely to come out ahead, as those dollars will inevitably be spent on goods or activities that involve fuel consumption— say, on increased access to the Internet, which is one of the fastest-growing energy drains in the world. (Cox writes that, by 2014, the U.S. computer network alone will each year require an amount of energy equivalent to the total electricity consumption of Australia.) The problem is exactly what Jevons said it was: the economical use of fuel is not equivalent to a diminished consumption. Schipper told me that economy-wide Jevons effects have “never been observed,” but you can find them almost anywhere you look: they are the history of civilization. Jevons died too soon to see the modern uses of oil and natural gas, and he obviously knew nothing of nuclear power. But he did explain why “alternative” energy sources, such as wind, hydropower, and biofuels (in his day, mainly firewood and whale oil), could not compete with coal: coal had replaced them, on account of its vastly greater portability, utility, and productivity. Early British steam engines were sometimes used to pump water to turn water wheels; we do the equivalent when we burn coal to make our toothbrushes move back and forth. Decreasing reliance on fossil fuels is a pressing global need. The question is whether improving efficiency, rather than reducing total consumption, can possibly bring about the desired result. Steven Chu told me that one of the appealing features of the efficiency discussions at the Clean Energy Ministerial was that they were never contentious. “It was the opposite,” he said. “No one was debating about who’s responsible, and there was no finger-pointing or trying to lay blame.” This seems encouraging in one way but dismaying in another. Given the known level of global disagreement about energy and climate matters, shouldn’t there have been some angry table-banging? Advocating efficiency involves virtually no political risk—unlike measures that do call for sacrifice, such as capping emissions or putting a price on carbon or increasing energy taxes or investing heavily in utility-scale renewable-energy facilities or confronting the deeply divisive issue of global energy equity. Improving efficiency is easy to endorse: we’ve been doing it, globally, for centuries. It’s how we created the problems we’re now trying to solve. Efficiency proponents often express incredulity at the idea that squeezing more consumption from less fuel could somehow carry an environmental cost. Amory Lovins once wrote that, if Jevons’s argument is correct, “we should mandate inefficient equipment to save energy.” As Lovins intended, this seems laughably illogical—but is it? If the only motor vehicle available today were a 1920 Model T, how many miles do you think you’d drive each year, and how far do you think you’d live from where you work? No one’s going to “mandate inefficient equipment,” but, unless we’re willing to do the equivalent—say, by mandating costlier energy—increased efficiency, as Jevons predicted, can only make our predicament worse. At the end of “The Coal Question,” Jevons concluded that Britain faced a choice between “brief greatness and longer continued mediocrity.” His preference was for mediocrity, by which he meant something like “sustainability.” Our world is different from his, but most of the central arguments of his book still apply. Steve Sorrell, who is a senior fellow at Sussex University and a co-editor of a recent comprehensive book on rebound, called “Energy Efficiency and Sustainable Consumption,” told me, “I think the point may be that Jevons has yet to be disproved. It is rather hard to demonstrate the validity of his proposition, but certainly the historical evidence to date is wholly consistent with what he was arguing.” That might be something to think about as we climb into our plug-in hybrids and continue our journey, with ever-increasing efficiency, down the road paved with good intentions.

### AT: Growth Good – Tech

#### Collapse of growth is a prerequisite to developing sustainable technologies

David Ehrenfeld, Dept. of Ecology, Evolution, and Natural Resources @ Rutgers University, April 2005, “The Environmental Limits to Globalization,” Conservation Biology, Pages 318–326 Volume 19, No. 2, April 2005, Ebsco.

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).

### AT: Growth Good – Tech

#### Growth’s emission creation outweighs benefits from expanded technology – allows higher consumption which swamps the reduction from technology

Juliet Schor, Prof. of Economics @ Boston College, 5-24-2010, “Beyond Business as Usual,” The Nation, http://www.thenation.com/article/beyond-business-usual#

The other flaw in the "grow our way out of unemployment" approach is that it's ecological suicide. The latest findings on climate change are that we have already passed critical, frightening thresholds. We must reduce atmospheric concentrations of carbon dioxide to 350 parts per million as quickly as possible even to have a chance at forestalling catastrophe. As Americans, our responsibility to reduce emissions is unique. Our 4 percent of the planet's population accounts for 28 percent of its total carbon legacy, and our annual per capita carbon footprint is twice the size of many Western European countries'. It's more than quadruple that of China. A bottom-up, technology-based shift to cleaner energy is essential, but its effects will phase in gradually. It's nearly impossible to meet emission targets only by reducing the carbon intensity of each dollar spent. But we can get results immediately by changing the path of aggregate output. As American GDP fell in 2008, so did greenhouse gas emissions. Progressive economists have mostly responded to the economic crisis with retro-policy, advocating financial reform and spending on infrastructure, including on green jobs. These things are necessary. But New Deal 2.0—expanded federal spending—still relies on climate-destabilizing growth. The retrofits and conservation measures that result from green jobs programs in effect mimic reductions in the price of energy. They free up purchasing power for other goods and services, the production of which causes more emissions. Unless we find a solution that does not rely on expanding overall demand, we'll be addressing unemployment by unleashing even more climate chaos.

### AT: Growth Good – Tech

#### Tech expansion accelerates ecological destruction under the current value system – not enough to compensate for its own expansion in population and consumption

M. H. Huesemann, Marine Sciences Laboratory, Pacific Northwest National Laboratory, 2008, “Will progress in science and technology avert or accelerate global collapse? A critical analysis and policy recommendations,” Environ Dev Sustain (2008) 10:787–825, Springer.

Industrial society will move towards collapse if its total environmental impact (I), expressed either in terms of energy and materials use or in terms of pollution, increases with time, i.e., dI/dt > 0. The traditional interpretation of the I = PAT equation reflects the optimistic belief that technological innovation, particularly improvements in eco-efficiency, will significantly reduce the technology (T) factor, and thereby result in a corresponding decline in impact (I). Unfortunately, this interpretation of the I = PAT equation ignores the effects of technological change on the other two factors: population (P) and per capita affluence (A). A more heuristic formulation of this equation is I = P(T)ÆA(T)ÆT in which the dependence of P and A on T is apparent. From historical evidence, it is clear that technological revolutions (tool-making, agricultural, and industrial) have been the primary driving forces behind successive population explosions, and that modern communication and transportation technologies have been employed to transform a large proportion of the world’s inhabitants into consumers of material- and energyintensive products and services. In addition, factor analysis from neoclassical growth theory and the rebound effect provide evidence that science and technology have played a key role in contributing to rising living standards. While technological change has thus contributed to significant increases in both P and A, it has at the same time brought about considerable eco-efficiency improvements. Unfortunately, reductions in the T-factor have generally not been sufficiently rapid to compensate for the simultaneous increases in both P and A. As a result, total impact, in terms of energy production, mineral extraction, land-use and CO2 emissions, has in most cases increased with time, indicating that industrial society is nevertheless moving towards collapse. The belief that continued and even accelerated scientific research and technological innovation will automatically result in sustainability and avert collapse is at best mistaken. Innovations in science and technology will be necessary but alone will be insufficient for sustainability. Consequently, what is most needed are specific policies designed to decrease total impact, such as (a) halting population growth via effective population stabilization plans and better access to birth control methods, (b) reducing total matter-energy throughput and pollution by removing perverse subsidies, imposing regulations that limit waste discharges and the depletion of non-renewable resources, and implementing ecological tax reform, and (c) moving towards a steady-state economy in which per-capita affluence is stabilized at lower levels by replacing wasteful conspicuous material consumption with social alternatives known to enhance subjective well-being. While science and technology must play an important role in the implementation of these policies, none will be enacted without a fundamental change in society’s dominant values of growth and exploitation. Thus, value change is the most important prerequisite for avoiding global collapse.

### AT: Growth Good – Tech

#### Tech can’t solve fast enough – numerous spikes happen in 2030

Ted Trainer, Visiting Fellow in the Faculty of Arts at the University of NSW, senior lecturer in sociology, 10-22-2009, “An Outline of the Global Situation, the Sustainable Alternative Society, and The Transition To It,” http://socialsciences.arts.unsw.edu.au/tsw/TSWmain.html

Most people assume that the development of better technology will enable us to go on enjoying affluent lifestyles and pursuing limitless economic growth, by reducing the energy and resource inputs needed to produce things. However the magnitude of our over-consumption makes this impossible. Perhaps the best known "technical fix" optimist, Amory Lovins, claims that we could double global output while halving the resource and environmental impacts, i.e., achieve a "Factor Four" reduction. (Weisacher and Lovins, 1997.) But this would be nowhere near enough to solve the problems. Let us assume that present global resource and ecological impacts must be halved. From above, if we in rich countries average 3% growth, and 9 billion rose to the living standards we would then have by 2070, total world output would be 60 times as great as it is today. Now do you think technical advance will make it possible to multiply total world economic output by 60 while halving impacts, i.e., make a Factor 120 reduction possible? The most important tech-fix faith is that we can change to use of renewable energy sources and thus avoid use of carbon fuels. There is a strong case that this unquestioned belief is invalid. (See Trainer, 2007, 2008.) Just consider the liquid fuel problem. We will probably be able to produce 7 GJ of ethanol per tonne of biomass, and to grow biomass at no more than 7 t/ha (if the scale is very large.) To provide the 128 GJ p.a. of liquid fuel (oil plus gas) that an Australian now consumes on average we would need 2.56 ha of biomass plantation. To provide this energy to 9+ billion we would need some 25 billion ha of plantations…on a planet with only 13 billion ha of land! The situation re electricity is more complex, but quite problematic. (Trainer, 2008.) Only 25% of our final energy use takes the form of electricity, but it is what almost all renewable energy sources produce. The biggest problems are set by the variability of renewables and by winter. For instance where will Europe get perhaps 300 GW in those periods when the continent has calm and cloudy weather for several days in a row, meaning no solar or wind input? (See Trainer 2008 on the difficulty associated with large scale .solar thermal located in deserts.) Even if better technology was capable of finding alternative ways of sustaining affluent-consumer society, there isn’t time to do this on the scale required. There are good reasons for thinking that it will all be over by 2040. Mason for instance (2003), Beddington (2009) and Heinberg, (2003, 2008) discuss the way several very serious problems are likely to come to a head in “The 2030 Spike”, including shortages of oil, water, food, land, forests, fish, phosphorus and several other several minerals, along with the effects of the greenhouse problem and a population heading for 9 billion. If renewable energy was to replace fossil fuels in Australia by 2040 we would have to build the equivalent of half our present power stations every year until then.

### AT: Growth Good – Green Transition

#### Growth swamps the effects of green technology – money saved gets put back into polluting and depleting consumer goods

M. H. Huesemann, Marine Sciences Laboratory, Pacific Northwest National Laboratory, 2008, “Will progress in science and technology avert or accelerate global collapse? A critical analysis and policy recommendations,” Environ Dev Sustain (2008) 10:787–825, Springer.

A switch to green consumption will only have a marginal positive environmental effect if per-capita income remains constant or continues to rise. This is because any money saved as a result of consuming the often more cost-effective greener goods and services is likely to be re-spent on other products, resulting in more resource consumption and pollution (Chalkley, Billett, & Harrison, 2001). For example, Alfredsson (2004) recently presented hypothetical green consumption scenarios for food, travel, and housing in Sweden and found that about 50% of the saved money is likely to be re-spent on other green products and services, thereby taking back approximately 33% and 20% of the initial energy and greenhouse gas reductions, respectively. Moreover, by around 2020, the resulting small decrease in household energy use (13%) and CO2 emissions (25%) would be outpaced by even the most modest growth in income (i.e., only 1% per year), thereby nullifying any potential benefits of green consumption alternatives. Similarly, Hannon (1975) showed more than 30 years ago that per capita energy consumption is linearly related to personal income. As a result of the re-spending effect, it is extremely difficult to reduce per-capita energy consumption unless total income is reduced. Finally, even if per-capita income were to be significantly reduced by imposing environmental taxes, the problem of allocating tax revenues arises. Unless these are reinvested in natural capital and used for the restoration of the environment (Rees & Wackernagel, 1995), government revenues generally will be circulated back into the economy in the form of salaries and goods, thereby stimulating material consumption (Sanne, 2000). In conclusion, any financial savings obtained through the elimination of conspicuous consumption through green consumption alternatives will likely be re-spent10 on the consumption of other goods and services unless total per-capita income is reduced. A reduction in per-capita income is a key requirement for achieving environmental and societal sustainability in industrialized nations. Given that social science research into loss aversion has shown that most people are unwilling to give up income they already have (Kahnemann & Tversky, 1984), the crucial policy question becomes how to convince people to give up income and reduce material consumption. Before attempting to address this question, it must be recognized that gains in labor productivity due to technological innovation can be used to either increase per-capita income or decrease working time, or both (Ausubel & Gruebler, 1995; Schor, 1992). As shown in Fig. 10 for the U.S. from 1870 to 1989, the almost 12-fold increase in labor productivity (GDP output per person-hour worked) was converted into a 6-fold increase in affluence (per capita GDP) and a ca. 50% reduction in total hours worked (i.e., from 2964 to 1604 hours per year). In a perfectly free market, workers could choose to split the benefits derived from labor productivity gains into their preferred mix of income and leisure time. Unfortunately, as Schor (2005) has shown, there is currently a structural bias towards increased working hours which is due to various employer incentives.

### AT: Growth Good – Renewables

#### Renewables can’t sustain growth – unstable production

Ted Trainer, Visiting Fellow in the Faculty of Arts at the University of NSW, 5-20-2011, “Why the world can't rely on renewable energy if we want to remain affluent,” Online Opinion, www.onlineopinion.com.au/view.asp?article=12070&page=0

There are several impressive studies and reports proving that the world could indeed run entirely on renewable energy sources. As this is what everyone wishes to believe, it is not surprising that there has been almost no examination of the possible limits to renewable energy. For some years I have been attempting to clarify the situation and I believe there is a strong case that our world cannot run on renewable energy. The main problem for renewables is to do with the variability of the two major sources, sun and wind. For years Mark Diesendorf and many others have argued that this does not prevent renewables from providing all the energy that energy-intensive societies will demand. Following is a brief indication of the reasons for thinking that this conclusion is mistaken. First, the obvious point that even on a sunny day PV panels can provide no energy for about 16 hours of that day. Similarly there are times when there is close to no wind blowing in your region, and these times can last for many days. Weather comes across in very large synoptic patterns and these can leave the entire continent of Europe under conditions of intense calm, cloud and cold for a week at a time. Lenzen’s review of renewable energy (Current State of Electricity Generating Technologies 2009) includes a plot for the whole of Germany showing hardly any wind input for several days in a row. Germany's not in a good wind region but several studies show that the same problem applies to the U.K, probably the world’s best inhabited wind region. Coppin and Davey (2003) make the same point for Australia, indicating that for 20 per cent of the time a wind system integrated across 1500 km from Adelaide to Brisbane would be operating at under 8 per cent of peak capacity. Mackay (2008) found that data from Ireland between October 2006 and February 2007 had a 15-day lull over the whole country. For five days output from wind turbines was 5 per cent of capacity and fell to 2 per cent on one day. What’s more at these times of low renewable energy demand can peak. Most renewable energy enthusiasts make the mistake of discussing the issues only in terms of averages. What matters are: minima in available renewable sources (the solar radiation over a whole mid winter month for a particular year and place can be 40 per cent below the average level for that month and place, and lower than that on specific days (NASA, 2010); and maxima/peaks in demand. What matters even more is the fact that the two can coincide in time, for example, Victorian demand peaks in stable winter cold snaps. On these occasions you might need more than twice the generating capacity that would meet annual average demand, and you might be able to get none of it from wind and PV. That means that on these occasions you will have to meet most of demand from other sources. All the renewable-optimistic reports I have read, including those by Stern (2006), The World Wide Fund for Nature (2010), Greenpeace, Zero Carbon Britain and Zero Carbon Australia make the same fundamental and fatal mistake. They fail to recognise the need for massive redundancy in generating capacity, caused by the fact that often one or more component systems will not be contributing much if anything. When the solar energy is low you will need enough wind or some other capacity to make up that deficiency. Stern for instance proposes wind will provide 8 per cent of annual demand. He then proceeds as if we will only have to build enough wind plant to generate 8 per cent of annual demand. This fails to recognise that there will be times when all that wind capacity is contributing almost nothing and will have to sit idle while PV or some other source fills the gap. Similarly there will be times when there is no sun and you will need to have enough windmills etc., to meet all the demand. So we might have to build enough wind capacity to meet 100 per cent of demand. When there is no sun, and we might also need to build enough solar capacity to meet 100 per cent of demand. When there is no wind, it means total system capital cost might be several times what we thought it would be. This exposes the common fallacy expressed as “...but the wind is always blowing somewhere.” Sometimes there is hardly any wind anywhere you can tap, but more importantly if it is blowing strongly today in region ‘A’ and Stern is going to provide his wind quota from that region today, then he will have to build in that region enough capacity to provide it all. And what if tomorrow the wind is only blowing well in region ‘B’? Obviously we will need to build sufficient capacity to meet the wind quota in every region where the wind might be blowing well on a particular day. We will have to build far more windmills than would contribute that 8 per cent of total demand. Advertisement "We'll store it" This problem of intermittency and redundancy would not exist if electricity could be stored in very large quantities. But this can’t be done and it is not foreseen. Pumping water up into high dams is the best option. Mackay (2008) shows that even in Britain where it rains a lot development of all possible sites couldn’t plug gaps in wind supply. Hydro electricity provides only about 15 per cent of world electricity, and 6 to 10 per cent of Australian electricity (i.e., only 2 per cent of all our energy), so it couldn’t meet anything like total demand when there is no wind or sun (even if all dams could be adapted to it and few can be because you need a low and a high storage space). Using electricity to compress air is viable, but you have to burn gas to heat the compressed air or efficiency is quite low and the availability of caverns is a problem. New batteries are being used to store wind energy, but at present only on a minute scale (30 MW compared with what would be needed, e.g., 96,000 MWh to get a solar power station through a four day cloudy period. Exetec is aiming for batteries costing $500/kWh, but that means storing for night time supply from a 1000 MWPV power station would cost you $8b, about four times as much as a coal-fired power station. The options? Lenzen’s review of renewable concludes that it is not possible for wind to contribute more than 20 to 25 per cent of electricity demand because problems caused by variability increase steeply after that point, setting integration difficulties. He suggests that a slightly higher figure for PV. But this is debateable. This means that wind and PV can at best supply 55 per cent of the 20 per cent of energy that takes the form of electricity. Where are we going to get the other 89 per cent? Lets briefly consider the options. Biomass In an era when land is being lost and a food crisis is developing, the world is very unlikely to find as much as a 1 billion hectare on which to plant biomass energy crops. The loss of habitat is the cause of the holocaust of extinctions we are now causing so we should be returning vast areas nature, not thinking about taking more. If that area was put into producing ethanol we would probably get 50 EJ which is around 5 per cent of the world energy demand figure we are heading for by 2050. Geothermal Even the renewables-optimistic WWF Energy Report (2010) and the claims of Jacobson and Delucci (2011) assume geothermal can contribute about 4 per cent of world energy. Australia has much better hot dry rock heat resources than the rest of the world but it is anything but clear how effectively they can be tapped, if at all. How much energy will it take to bore holes 5 km deep through rock, fracture rock down there, pump water down and force it 500 metres across to the nearest rising hole? What will be the temperature and rate of flow of the water that comes up, and what generation efficiency will that enable? And what will be the dollar and energy costs of constructing very long transmission lines from the deserts where the hot rock is? The answers are not known yet. The only operating plant in Australia (not at the most promising location) achieves 6 per cent efficiency, one-sixth the value for a coal-fired power station. Early in 2010 the much-publicised Geodynamics venture abandoned its efforts, writing off $350 million. Solar thermal Here’s the back-of-envelope calculation. The world is heading towards needing 700 EJ/y of final (not primary) energy by 2050 (Moriarty and Honnery, What energy levels can the earth sustain, 2009). effort Let us assume a 33 per cent reduction in demand due to energy efficiency. My review of solar thermal systems found that in mid-winter both central receivers and Big Dishes could probably deliver at distance a continual flow of about 25W/m2 of collection area. Probably the best strategy. Big Dishes using ammonia for heat storage, might cost $600 per square metre in future. This means we’d need 1,980 million of them, the total cost would be $475 trillion, i.e., $19 trillion p.a. assuming a 25-year lifetime. If we assume world GDP will treble by 2050 this sum would be 13 times the present ratio of energy investment to GDP in developed countries. Note that other costs such as the transmission lines, thousands of kilometres from the deserts, have not been included. And we would still have a problem of intermittency; i.e., what to do when there is little or no sun on the solar thermal fields for days at a time...pay for huge excess heat tank storage capacity Hydrogen How about using huge numbers of windmills, the cheapest renewable source, to produce and store hydrogen. The energy efficiencies of a) producing hydrogen from electricity, b) compressing, pumping and distributing it, and c) re-generating electricity via (very expensive) fuel cells are optimistic, meaning that for each kWh your windmills generate you end up with .22 kWh to use via this path. So a crude estimate is that to supply 89 per cent of that 700 EJ/y this way we would have to produce 2,8232 EJ/y, and we would need 179 million windmills each of 1.5 MW peak capacity (each producing on average .5 MW or 15.8 TJ/y and costing $3 million), at a total cost of $534 trillion, i.e., about the same cost as the solar thermal option. We would have to add the cost of the hydrogen production compression/liquifaction, distribution and huge storage capacity. Whatever option you choose, you might have to multiply the total by 1.75 to pay the interest on the capital borrowed to build all that renewable plant. Finally, the cost of energy and materials are now rising fast and will be much higher than is assumed in the above exercise. All this has been a long-winded way of saying that we couldn’t possibly afford it. By the way, if your goal was to provide to all people, probably 9+ billion by 2050 the energy per capita Australians are heading for, your target would be 5 times as great as the 700 EJ/y assumed in the above exercises. Do you still think the world can all live affluently on renewables? What is the answer then? The point is, there isn’t one. If the question is how can we provide the energy to keep going the energy-intensive, growth and market driven societies we have in rich countries today, let alone to enable the continuous and limitless pursuit of ever-increasingaffluent living standards, then the answer is that it cannot be done. For decades many of us have been trying to get the mainstream to grasp that this quest is suicidal. We Australians now have a productive land footprint that is ten times as big as would be possible for all people in 2050. It is precisely the mania for affluence and ever-greater levels of production, consumption and GDP that is causing all the big global problems, most obviously resource depletion, Third World deprivation, the greenhouse problem, the destruction of the environment, and international conflict. Such a society cannot be fixed. For instance you cannot reform a growth-based society so that it can have a zero growth economy, let alone one producing at a small fraction of present levels. Sustainability is not achievable without scrapping and replacing several of the fundamental structures of this society.

### AT: Growth Good – Efficiency

#### Jevons’ Paradox defeats innovation – lower costs means more consumption – collapse now key to sustainable reduction in consumption

Greg Lindsay, staff writer, 3-16-2010, “Jevons' Paradox and the Perils of Efficient Energy Use,” Fast Company, http://www.fastcompany.com/1583947/peak-oil-new-urbanism-biofuels-solazyme

How else to explain the hostility directed at Amory Lovins by Kunstler and others? Lovins identified the hard and soft paths of fossil fuels versus conservation and renewables thirty-four years ago, and has since written books like Winning the Oil Endgame and Small is Beautiful, in which he called for a massively distributed, solar-powered "microgrid." But Lovins earned ridicule for his still-unrealized vision of a "hypercar" made of composites and electric drive trains three-to-five times more efficient than existing models. The hypercar, Kunstler wrote, "Would have only promoted the unhelpful idea that Americans can continue to lead urban lives in the rural setting." (To add insult to injury, Lovins' Rocky Mountain Institute is accessible only by car.) Why unhelpful? In a phrase: Jevons' Paradox. Nearly a century before the geologist M. King Hubbert began calculating peak oil, the economist William Stanley Jevons discovered, to his horror, peak coal. In The Coal Question, published in 1865, Jevons raised the questions which haunt sustainability advocates to this day: "Are we wise in allowing the commerce of this country to rise beyond the point at which we can long maintain it?" He estimated Britain's coal production would reach a peak in less than a hundred years, with calamitous economic and Malthusian consequences. The engine of coal's demise would be the same invention that was created to conserve it: the steam engine. But it made burning coal so efficient, that instead of conserving coal, it drove the price down until everyone was burning it. This is Jevons' Paradox: the more efficiently you use a resource, the more of it you will use. Put another way: the better the machine--or fuel--the broader its adoption. A corollary is the Piggy Principle: instead of saving the energy conserved through efficiency, we find new ways to spend it, leading to greater consumption than before. No wonder Kunstler is alarmed that a hyper-efficient hypercar would lead to hyper-sprawl--it's only been the pattern throughout all of human history. Maybe the worst thing that could happen to new urbanism would be an incredibly efficient new car (or fuel) that allows Americans (and, increasingly, the Chinese) to carry on as before, as an oil glut allowed us to do between 1979 and 2001. Crisis is on their side. Jevons' peak coal reckoning was postponed by a new fuel source discovered a few years earlier in the Pennsylvania hills: oil. Today, there is another liquid fuel source on the horizon, provided it can scale: next-generation biofuels. Peak Oilers take it as an article of faith that biofuels won't work (and for now they have both physics and economics in their corner). But reading books like the ones mentioned above (or watching films like The End of Suburbia and Collapse) one gets the feeling they're actively rooting against them as well. "A crisis is a terrible thing to waste," Paul Romer once said. Especially if you waste one by solving it and forgetting it ever happened.

### AT: Bio-Sphere Engineering

#### Biospheres are too complex to engineer – ending growth is a safer option.

Glen Barry, Ph.D. in Land Resources from the University of Wisconsin-Madison, MS in Conservation Biology and Sustainable Development from Madison, Founder and President of Ecological Internet, 1-5-2010, “EARTH MEANDERS: Resisting Global Ecological Change,” EcoEarth, http://www.ecoearth.info/blog/2010/01/earth\_meanders\_resisting\_globa.asp

The only “Plan B” offered by the ruling elite is to actively consider geoengineering global ecological processes and countless other techno-fixes. Rather than power down or sacrifice, it appears we as a species are willing to gamble with long odds with our and all lives. As if scouring all sorts of ecosystems of their life, global polluting industrialism, and embrace of consumption as the meaning of life is not enough of a load for global ecosystems. Now it is proposed we further alter oceans and the atmosphere unnaturally at a global scale to engineer a biosphere. Humans cannot control most invasive species, keep oil out of water, or feed everyone; yet now we are fit to run the biosphere? Unintended, inequitable and horrendous consequences are assured. Gaia – the Earth System – is far too complex to engineer and trying will seal the demise of our shared, finely honed, and naturally evolved biosphere. Geoengineering and the blind faith in technology it represents can only lead to further degradation of ecosystems and biosphere, over population and consumption, while virtually annihilating any chance of maintaining a natural and habitable Earth. It would be far better to embrace ecological restoration and other necessary policy measures including ending coal, industrial agricultural and old forest logging. A biosphere can never be engineered, but it may be planted, tended and assisted to restore itself. First you take the pressure off ecosystems, and then allow and assist them to naturally recover. Global ecological protection and restoration is the only sort of human ecosystem manipulation that can save us now. Given the momentum of seven billion super-predators consuming ecosystems to meet their every (and endless) whims, it is not possible to stop social, economic and ecological collapse. But there is a still chance of a worthy human society post economic and ecological collapse if we return to the land, power down and resist. It is all about having as much intact ecosystems as possible to lighten the blow and reconstitute society and ecosystems post-collapse. Here, and in my forth-coming book “New Earth Rising”, as a political ecologist I offer a very different plan to the blind faith in technological progress that removes us more from natural life-giving ecosystem processes and patterns. Perhaps this can be called Plan “ER” for Earth Restoration.

### AT: Bio-Sphere Engineering

#### Systems are too complex – large scale manipulations cause extinction

Glen Barry, Ph.D. in Land Resources from the University of Wisconsin-Madison, MS in Conservation Biology and Sustainable Development from Madison, Founder and President of Ecological Internet, 10-22-2007, “The folly, egoism and dangers of climate geo-engineering,” Growth is Madness, http://growthmadness.org/2007/10/22/the-folly-egoism-and-dangers-of-climate-geo-engineering/#more-216

It is being widely suggested that humanity can “geo-engineer” a global solution to climate change; that is, modify the Earth’s biosphere at a planetary scale. Many methods are proposed. Most include either reflecting additional solar radiation away from the Earth, or using the ocean to store more carbon. Reactionary geo-engineering proposals emerge largely from a sense of desperation as the world fails to rein in greenhouse gas emissions, and an unwillingness to make necessary societal and personal changes in response to deadly climate change. To some the extreme action of taking the Earth’s ecological systems into techno-human hands seems sensible given indications that global heating is proceeding more rapidly than thought, as shown by unexpectedly quick melting of Arctic sea ice. Risky climate geo-engineering schemes include giant vertical pipes in the ocean to increase ocean circulation and thus marine carbon sequestration, similarly growing vast blooms of ocean plankton by fertilizing with iron, erecting giant mirrors above the earth to reflect the sun’s energy, and dropping sulfur particles from balloons at high altitude to do the same. Two rogue US companies are moving forward with plans to fertilize the ocean with iron to create plankton blooms to suck heat-trapping carbon dioxide out of the atmosphere. They are motivated by profits from the growing carbon credit market, rising public demands for action, and politicians eager to avoid painful reductions in emissions. There is little that can be done to stop them, as no applicable laws or treaties exist. Such efforts to “manage” Gaia are absolute madness – betting the planet and humanity on something as complex as artificially regulating a biosphere. Radical geo-engineering proposals could just as easily worsen the situation if these projects fail or are suddenly halted. And it is highly likely that unintended consequences of widespread implementation of such schemes would outweigh possible benefits. Have we learned nothing from the biofuels boondoggle? Failure could destroy the Earth. There has been little research on the potential impacts upon marine ecosystems. The powerful greenhouse gas nitrous oxide may be released as marine organic matter decomposes. Oxygen may become depleted in the deep ocean, killing fish and throwing already troubled marine ecosystems into further turmoil. Even James Lovelock, the British scientist that first conceived of Gaia as a self-regulating organism, has fallen victim to favoring human technology over proven Earth processes. Gaia, the Earth System, is a finely honed creature with unbelievably complex and ancient existing systems of planetary regulation. Messing with ocean carbon storage and solar radiation levels will affect ocean currents and acidity, atmospheric circulation and weather. Almost certainly there will be a whole host of follow-on effects, and dependable climatic patterns are likely to be further seriously diminished. It is unfathomable to me that after millennia of ecological ignorance and unconstrained global ecological change leading to our current ecological crises, that a handful of scientists and business people could be so egotistical as to suppose they can play God and refashion a planet. Once geo-engineering is embraced, we could never stop, or the carbon would be re-released. Again, to propose human management of the biosphere is so egoistical and dangerous; and wrong on so many levels. These may be desperate times, but governments have not even acted yet to set mandatory reductions in greenhouse gas emissions. The skeptics have only just gone from denying the problem to minimizing its importance. Rather than embracing known sufficient policies that could solve the problem by transforming our energy and transportation systems, it is human nature to seek the easy way out. Yet reducing emissions of CO2, population, and consumption; and restoring global ecological systems, is so much more likely to be effective. So much nature remains — that could be enlarged, reconnected and regenerated — that it is wrong to give up on natural ecosystems’ processes to embrace a techno-industrial “Frankensphere”. A failing biosphere can never be managed in any real sense to mimic a healthy biosphere. It is simply too complex. If SUVs and coal plants are still spewing carbon dioxide into the atmosphere, clearly risky geo-engineering is unjustified. Humanity is unable to eliminate exotic species, live peacefully, end deforestation, or stop having so many babies; yet it is going to take the global ecosystem into its management? Geo-engineering cannot succeed and it is terribly misguided to suggest it can.

### Environmental Destruction Bad – War

#### Environmental collapse causes war

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If such "environmental scarcities" become severe, could they precipitate violent civil or international conflict? I have previously surveyed the issues and evidence surrounding this question and proposed an agenda for further research.1 Here I report the results of an international research project guided by this agenda.2 Following a brief review of my original hypotheses and the project's research design, I present several general findings of this research that led me to revise the original hypotheses. The article continues with an account of empirical evidence for and against the revised hypotheses, and it concludes with an assessment of the implications of environmentally induced conflict for international security. In brief, our research showed that environmental scarcities are already contributing to violent conflicts in many parts of the developing world. These conflicts are probably the early signs of an upsurge of violence in the coming decades that will be induced or aggravated by scarcity. The violence will usually be sub-national, persistent, and diffuse. Poor societies will be particularly affected since they are less able to buffer themselves from environmental scarcities and the social crises they cause. These societies are, in fact, already suffering acute hardship from shortages of water, forests, and especially fertile land. Social conflict is not always a bad thing: mass mobilization and civil strife can produce opportunities for beneficial change in the distribution of land and wealth and in processes of governance. But fast-moving, unpredictable, and complex environmental problems can overwhelm efforts at constructive social reform. Moreover, scarcity can sharply increase demands on key institutions, such as the state, while it simultaneously reduces their capacity to meet those demands. These pressures increase the chance that the state will either fragment or become more authoritarian. The negative effects of severe environmental scarcity are therefore likely to outweigh the positive.

## AT: Growth Good – Heg

### AT: Growth Good – Heg

#### Economic crises are universal – won’t impact US leadership

Lawrence Freedman, Prof of war studies @ King’s College London, 2009, “A Subversive on the Hill,” The National Interest, May-June, Lexis.

It is at the regional level rather than the global level that the American position might become vulnerable. The current crisis may well produce great turbulence in particular countries or groups of countries at a time when the United States feels it has enough on its plate internationally and is in an introspective mood because of the severity of its own economic challenges. Yet, contrary to early expectations, **the economic crisis has not in itself led to a shifting of power balances.** When the crisis was assumed to be largely financial in nature, so that the United States and the United Kingdom would suffer most, **a shift to** the surging economy of **China was anticipated**. Continental Europe could look on smugly and the oil producers would continue to benefit from high prices. **The collapse of world trade, and subsequently the price of oil, soon made these judgments look premature. Indeed, the shock may be greater for countries with no relevant experience of the business cycle or else**, as with the oil producers, **burdened with ambitious plans based on the always-dangerous assumption that the recent past describes an indefinite future. The crisis is pulling everyone down: for the moment, at least, there are no clear winners.** If the United States was the only country held back because of its economic difficulties then others might well take advantage of perceived American weakness. But in this case, **with everyone struggling** to confront big domestic issues, **the United States is unlikely to face major challengers**. When a state is forced to dedicate resources to internal problems, it has its own incentives to keep external relations calm. True, unforeseen crises can upset all calculations, but **shared weakness may give the Obama administration some relief in terms of how it might be tested**. It is already committed to addressing these various regional conflicts with a greater reliance on diplomatic means than the Bush administration, a sign that new military conflicts are unlikely.

## AT: Growth Good – Space

### AT: Space

#### Give low priority to colonization – it’s impossible, low risk of natural threats causing extinction, and doesn’t solve.

Hard SF, articles focusing on delineating science from science fiction, 5-10-2007, “Can Space Colonization Guarantee Human Survival?” http://www.hardsf.org/IssuSpac.htm

There are many current and potential threats to the human race. However, considering the human source of many of the threats and the time-scales involved, I'm not sure that space colonization should be the top priority in preempting those threats. Timescales To consider how well space colonization is likely to solve our problems we need to ask what the time-scales of sustainable, independent space colonies are. If, after disaster strikes Earth, Earth is still able to supplement the needs of space colonies, then those space colonies aren't necessarily essential to continuing the human race. We have to ask when space colonies would be functioning without need of any assistance from Earth. Truly independent space colonies must not simply provide bare nutrition, air, heat, and habitat repair for 100 years. They should have a non-traumatizing environment with enough people to protect against dangerous levels of inbreeding – able to last and progress indefinitely. There will also be a minimum number of people required for any space colony in order to provide needed manpower in various occupations (one person with multiple occupations doesn’t help if you need two of those occupations in different places at the same time). How does that compare to the time-scales of threats from climate change, environmental crisis, nuclear / bio weapons and accidents, possible nanotech weapons or accidents, overpopulation, etc.? We also have to consider threats to the global economy, since an economic collapse would presumably at least interrupt efforts towards establishing space colonies. Economic crises also increase risks of war, which could have apocalyptic consequences. Even assuming the ultimate solution of human survival is space colonization, we may need to find a way to extend the lifespan of human civilization and economy on Earth in order to have time to accomplish sustainable space colonization. Consider the possible habitats. Space stations in orbit around Earth or at L5 have little natural resources at their location other than solar energy. The Moon has no atmosphere, a limited amount of water at best, which part of the Moon has access to solar energy varies during the month, and it's not considered one of the solar system's better sources of minerals. Venus is extremely hot, the atmosphere is dangerous and with the cloud cover I'm not sure how practical solar energy would be at the surface. Mars has too little atmosphere and accessible water is questionable, etc. Some of the outer planets' moons may have enough ice and raw materials, but are very cold, lack usable atmospheres and get limited solar energy. And so on. We may be able to establish bases at some of these places in a realistically short amount of time, but not independent ones. Any colony that wants to get resources from post-apocalyptic Earth will need to have spaceships that can land on Earth and later achieve escape velocity from Earth while carrying cargo without help from Earth. Otherwise, the needed resources may not be available from a single astronomical body. That could require longer-distance travel between bodies - whether that's between asteroids, between moons, between planets or some other combination. Significant space travel ability may be essential. A colony would need an industrial base capable of extracting and refining raw materials, and making useful things from them. Interstellar colonies and terraforming of planets in our solar system are longer-range goals. Colonies in any place other than an Earth-like planet will require a substantial infrastructure to allow humans to exist in an otherwise deadly environment. The colony needs to be able to maintain and repair that infrastructure... There is a significant difference between an enormous disaster on Earth and one at any space colony we can expect for at least a century. Even something on the scale of a "dinosaur killer" asteroid impact won't necessarily kill all humans on Earth. (However, if the world economy / technology is set back too much it may not be possible to re-achieve a hi-tech civilization. We've extracted most minerals / fossil fuels that can be gotten without hi-tech, a post-disaster society may be left unable to get these.) It will be a long time before an independent space colony could grow to the point some of its people could survive after a major disaster. Meanwhile, we have not yet solved the physical and psychological problems that develop during months of low gravity. Most of the physical issues may not be significant for those who never intend to return to Earth-type gravities. Psychological issues remain. Some physical issues may arise when dealing with years and decades in low gravity. Even in shorter spans of time, weakening bones may have serious consequences in low gravity situations. Weakened hip bones may be a problem for women giving birth in low gravity. Other stressful activities may also be problematic. We need to find out how low gravity will effect a fetus during pregnancy and child growth afterwards. Identifying and resolving all the issues is likely to take many years. Currently, our society is not inclined to invest that much in either stopping global warming (and other threats) or space habitats. It strikes me as improbable that we will see a heavy investment in both of them at the same time in the next period of time. My impression is the best chance for human survival is focusing as much as possible on one or the other of the two paths, and that space colonization will not solve the problem within the limited time-frame. Of course, if governments refuse to fund solutions to the environmental crisis, but budget money for space habitats we should use that money. Hopefully, governments will respond to the crisis before it’s too late and the problems will be brought under control and within safe limits. Then there will be no reason not to expand out into the universe. Postscript For those who still believe space colonization should be the priority, I would like to suggest one piece of advice. The known threats to human survival in the next century or so are not vast earthquakes and volcanoes, asteroid impacts, supernovas or other natural disasters. Most of them are at least partly (hu)man-made. If the same problems are not to threaten survival of humans on space colonies, we either have to make humans on Earth act more responsibly to ensure survival before we colonize, or we need to know how to insure that those people who colonize are not so prone to make the same mistakes their Earthly brothers do. If space colonization ends up amounting to running away from our problems, we will not have changed the odds of human survival by much. Space colonies would need to be planned in a way to avoid this fate.

### AT: Space – Impossible

#### No risk of colonization – bodies degenerate too quickly in space

Theunis Piersma, professor of animal ecology at the University of Groningen in the Netherlands and senior research scientist at the Royal Netherlands Institute, 11-16-2010, “Why space is the impossible frontier,” New Scientist, http://www.newscientist.com/article/mg20827860.100-why-space-is-the-impossible-frontier.html

Hawking, Obama and other proponents of long-term space travel are making a grave error. Humans cannot leave Earth for the several years that it takes to travel to Mars and back, for the simple reason that our biology is intimately connected to Earth. To function properly, we need gravity. Without it, the environment is less demanding on the human body in several ways, and this shows upon the return to Earth. Remember the sight of weakened astronauts emerging after the Apollo missions? That is as nothing compared with what would happen to astronauts returning from Mars. One of the first things to be affected is the heart, which shrinks by as much as a quarter after just one week in orbit (The New England Journal of Medicine, vol 358, p 1370). Heart atrophy leads to decreases in blood pressure and the amount of blood pushed out by the heart. In this way heart atrophy leads to reduced exercise capacity. Astronauts returning to Earth after several months in the International Space Station experience dizziness and blackouts because blood does not reach their brains in sufficient quantities. Six weeks in bed leads to about as much atrophy of the heart as one week in space, suggesting that the atrophy is caused by both weightlessness and the concomitant reduction in exercise. Other muscle tissue suffers too. The effects of weightlessness on the muscles of the limbs are easy to verify experimentally. Because they bear the body's weight, the "anti-gravity" muscles of the thighs and calves degenerate significantly when they are made redundant during space flight. Despite the best attempts to give replacement exercise to crew members on the International Space Station, after six months they had still lost 13 per cent of their calf muscle volume and 32 per cent of the maximum power that their leg muscles could deliver (Journal of Applied Physiology, vol 106, p 1159). Various metabolic changes also occur, including a decreased capacity for fat oxidation, which can lead to the build-up of fat in atrophied muscle. Space travellers also suffer deterioration of immune function both during and after their missions (Aviation, Space, and Environmental Medicine, vol 79, p 835). Arguably the most fearsome effect on bodies is bone loss (The Lancet, vol 355, p 1569). Although the hardness and strength of bone, and the relative ease with which it fossilises, give it an appearance of permanence, bone is actually a living and remarkably flexible tissue. In the late 19th century, the German anatomist Julius Wolff discovered that bones adjust to the loads that they are placed under. A decrease in load leads to the loss of bone material, while an increase leads to thicker bone. It is no surprise, then, that in the microgravity of space bones demineralise, especially those which normally bear the greatest load. Cosmonauts who spent half a year in space lost up to a quarter of the material in their shin bones, despite intensive exercise (The Lancet, vol 355, p 1607). Although experiments on chicken embryos on the International Space Station have established that bone formation does continue in microgravity, formation rates are overtaken by bone loss. What is of greatest concern here is that, unlike muscle loss which levels off with time, bone loss seems to continue at a steady rate of 1 to 2 per cent for every month of weightlessness. During a three-year mission to Mars, space travellers could lose around 50 per cent of their bone material, which would make it extremely difficult to return to Earth and its gravitational forces. Bone loss during space travel certainly brings home the maxim "use it or lose it". Bone loss is not permanent. Within six months of their return to Earth, those cosmonauts who spent half a year in space did show partial recovery of bone mass. However, even after a year of recovery, men who had been experimentally exposed to three months of total bed rest had not fully regained all the lost bone, though their calf muscles had recovered much earlier (Bone, vol 44, p 214). Space agencies will have to become very creative in addressing the issue of bone loss during flights to Mars. There are concepts in development for spacecraft with artificial gravity, but nobody even knows what gravitational force is needed to avoid the problems. So far, boneless creatures such as jellyfish are much more likely than people to be able to return safely to Earth after multi-year space trips. For humans, gravity is a Mars bar. The impossibility of an escape to space is just one of many examples of how our bodies, and those of our fellow organisms, are inseparable from the environments in which we live. In our futuristic ambitions we should not forget that our minds and bodies are connected to Earth as by an umbilical cord.

### AT: Asteroids

#### Low risk – newest surveys

Nell Greenfieldboyce, staff writer, 9-30-2011, “Asteroids Pose Less Risk To Earth Than Thought,” NPR, http://www.npr.org/2011/09/30/140934293/asteroids-pose-less-risk-to-earth-than-thought

Our planet's risk of being hit by a dangerous outer space rock may be smaller than scientists previously thought. That's according to a survey of the sky that NASA is calling the most accurate census yet of near-Earth asteroids. A NASA space telescope called the Wide-field Infrared Survey Explorer, or WISE, recently went searching for asteroids lurking nearby — and found far fewer than astronomers had expected. "Our understanding of the near-Earth asteroid population has been significantly improved, and we believe that the hazard to the Earth may be somewhat less," says Amy Mainzer of NASA's Jet Propulsion Lab in California, who led the new study. The Earth has been whacked by big space rocks in the past. One, about six miles across, is thought to have wiped out the dinosaurs. Scientists would like to prevent something like that from happening in the future, but it would take time to figure out how to best knock an incoming asteroid off its collision course. Our understanding of the near-Earth asteroid population has been significantly improved, and we believe that the hazard to the Earth may be somewhat less. - Amy Mainzer , NASA Jet Propulsion Lab "As one of my colleagues at the Jet Propulsion Laboratory likes to say, the best three ways of dealing with the potential of an asteroid impact are to find them early, find them early and find them early," Mainzer says. Most of the known near-Earth asteroids have been discovered with ground-based telescopes, but these can't see everything. To get a better sense of how many potentially dangerous asteroids might actually be out there, Mainzer and her colleagues did a new survey with the WISE telescope, launched in 2009. They used it to get a representative sample of these asteroids that orbit the sun and have a risk of crossing Earth's orbit. The study reassuringly suggests that astronomers already know the location of more than 90 percent of the very largest asteroids — the huge planet-busters that could cause mass extinctions. "By virtue of the fact that we know these objects and we know their orbits, we can predict that they are no longer hazardous to Earth, in the sense that we can follow them and we know that there are none that pose any imminent risk of an impact," Mainzer says. Fewer Midsize Asteroids There's also some good news when it comes to midsize asteroids, between 330 and 3,300 feet wide. The survey suggests there are only about 19,500 of them — far fewer than the 35,000 or so that scientists had expected.

## Growth Bad – War

### 1NC Growth Bad – War

#### Economic growth causes war – decline doesn’t cause war

Charles Boehmer, professor of political science at the University of Texas, El Paso and Ph.D. in Political Science from Pennsylvania State University, 2010, “Economic Growth and Violent International Conflict: 1875-1999,” Defence and Peace Economics, June, Vol. 21, Issue 3, pg. 249-268

The theory set forth earlier theorizes that economic growth increases perceptions of state strength, increasing the likelihood of violent interstate conflicts. Economic growth appears to increase the resolve of leaders to stand against challenges and the willingness to escalate disputes. A non-random pattern exists where higher rates of GDP growth over multiple years are positively and significantly related to the most severe international conflicts, whereas this is not true for overall conflict initiations. Moreover, growth of military expenditures, as a measure of the war chest proposition, does not offer any explanation for violent interstate conflicts. This is not to say that growth of military expenditures never has any effect on the occurrence of war, although such a link is not generally true in the aggregate using a large sample of states. In comparison, higher rates of economic growth are significantly related to violent interstate conflicts in the aggregate. States with growing economies are more apt to reciprocate military challenges by other states and become involved in violent interstate conflicts. The results also show that theories from the Crisis-Scarcity perspective lack explanatory power linking GDP growth rates to war at the state level of analysis. This is not to say that such theories completely lack explanatory power in general, but more particularly that they cannot directly link economic growth rates to state behavior in violent interstate conflicts. In contrast, theories of diversionary conflict may well hold some explanatory power, although not regarding GDP growth in a general test of states from all regions of the world across time. Perhaps diversionary theory better explains state behaviors short of war, where the costs of externalizing domestic tensions do not become too costly, or in relation to the foreign policies of particular countries. In many circumstances, engaging in a war to divert attention away from domestic conditions would seemingly exacerbate domestic crisis conditions unless the chances of victory were practically assured. Nonetheless, this study does show that domestic conflict is associated with interstate conflict. If diversionary conflict theory has any traction as an economic explanation of violent interstate conflicts, it may require the study of other explanatory variables besides overall GDP growth rates, such as unemployment or inflation rates. The contribution of this article has been to examine propositions about economic growth in a global study. Most existing studies on this topic focus on only the United States, samples of countries that are more developed on average (due to data availability in the past), or are based on historical information and not economic GDP data. While I have shown that there is no strong evidence linking military expenditures to violent interstate conflicts at the state level of analysis, much of the remaining Growth-as-Catalyst perspective is grounded in propositions that are not directly germane to questions about state conflict behavior, such as those linking state behavior to long-cycles, or those that remain at the systemic level. What answer remains linking economic growth to war once we eliminate military expenditures as an explanation? Considering that the concept of foreign policy mood is difficult to identify and measure, and that the bulk of the literature relies solely on the American historical experience, I do not rely on that concept. It is still possible that such moods affect some decision- makers. Instead, similar to Blainey, I find that economic growth, when sustained over a stretch of years, has its strongest effect on states once they find themselves in an international crisis. The results of this study suggest that states such as China, which have a higher level of opportunity to become involved in violent interstate conflicts due to their capabilities, geographic location, history of conflict, and so on, should also have a higher willingness to fight after enjoying multiple years of recent economic growth. One does not have to assume that an aggressive China will emerge from growth. If conflicts do present themselves, then China may be more likely to escalate a war given its recent national performance.

### Growth Bad – War

#### Growth is statistically correlated with war – collapse doesn’t cause war

Scott Bennett, Professor of Political Science at the Pennsylvania State University, and Allan C. Stam, Associate Professor in the Government Department at Dartmouth College, 2003, “The Behavioral Origins of War,” U Mich Press, http://www.press.umich.edu/pdf/0472098446-ch5.pdf

Consistent with Goldstein’s 1998 arguments, we find periods of system-wide economic growth associated with increased risks of disputes escalating to all levels of disputes, including those involving the use of force and large-scale war. In table 5.16, we see that across all conflict categories, the increases in risk are generally of similar magnitude, with a 40 to 100 percent increase in the odds of conflict involving force during periods of economic upswing compared to periods of downswing. Only the probability of having disputes without the use of any force appears to drop slightly. A somewhat discoursing finding is that the associated increase in risk appears strongest for disputes escalating to war, where the risk of such conflicts appears to be 80 to 100 percent higher than the baseline risk of war. These results stand in contrast to debates in the 1980s and early 1990s over relative versus absolute gains. Regime theorists such as Krasner and Keohane argued that states, when concerned with absolute (as compared to relative) gains, would be less conflict prone. This set off a long-running debate about the nature of states’ preferences, which in the end devolved to a discussion of whether there was really any distinction between the two, with the most rigorous theoretical analysis demonstrating that even absolute gains could only be measured in some context, a relative one (Powell 1991). Our results suggest that there is something of a Faustian trade-off between economic gains and the likelihood of war. During periods of sustained economic growth throughout the system, periods with absolute gains for all (or most) states, the incidence of war increases and rather dramatically so.

### Growth Bad – War

#### Prefer economic collapse as a strategy for minimizing violence – severity is strongly correlated with growth.

Joshua S. Goldstein, Professor of International Relations, American University, 1988, Long Cycles, pp. 244-248

 The connection between economic phase periods and wars is investigated in several ways. Levy’s “great powerwars” (class 2, above) are categorized (table 11.4) according to the economic phase period in which the war “mainly”fell (see definitions above, p. 239). Thirty-one wars occurred during upswings, twenty-seven during downswings, andsix seriously overlapped phase periods (see also table 11.5, column 7). Thus hardly any more wars occurred on theupswing phases than the downswings. But in total battle fatalities (severity), except for the 1575—94 upswing, thereis a clear alternation between upswing and downswing phases. More severe wars occurred during upswing phases. Ihave tabulated six war indicators by phase period (table 11 .5).26 The first indicator (col. 3) derives from the list of fatalities (table 11.4), here expressed as an average annual fatality rate in each phase.27 This indicator is alsodisplayed as a bar chart in figure 11.3. With the exception of the (low-fatality) upswing of 1575—94, fatalities followthe pattern of upswings and downswings throughout the 481-year span of the data. Up through 1892, the averageannual fatality rate was six times higher on upswings than on downswings; if the twentieth century is included, it is twenty-one times higher on upswings than downswings. Categorizing the same fatality data “strictly” by phase period(col. 4),28 in conjunction with the method just discussed, points to sensitivities to the exact dating of turning points. Not surprisingly, the main effect is on the twentieth century’s two world wars, each overlapping one to two years intoan adjacent phase. The results also show the weakest correlation to be in the period 1495—1620. Nonetheless, thefatality rate on upswings is still more than four times higher than on downswings for both 1495—1892 and 1495—1975. The greater severity of war on long wave upswings, then, is a very strong and consistent correlation.29

#### Growth creates arms races – makes more destructive wars inevitable

Christopher Chase-Dunn , Director of the Institute for Research on World-Systems, University of California-Riverside, and Bruce Podobnik , Assistant Professor in the Department of Sociology and Anthropology at Lewisand Clark College, 1999 , in The Future of Global Conflict, ed. Bornschier and Chase-Dunn, p. 48

In McNeill’s analysis of military technology and military organization, the competition among sovereign states forscarce resources is a constant, but the availability of resources to engage in warfare and to fund arms races is an upward trend sustained by the growth of industrial production in the context of the world market. The increasing availability of resources for war and the application of scientific research and development and national education systems to military technology lead to escalation of rounds of competition for superior arms capabilities among core states. The development of new communications and transportation technologies increases the speed at which information about changes in military technology diffuses among competing states, further driving the trend toward more expensive and more destructive weapons.

### Growth Bad – War

#### Economic growth fuels fast power transitions and democratic revolutions that undermine global political stability

Dani Rodrik, Professor of political economy at Harvard University, 2-13-2011, "Economic growth is not enough" www.thestar.com/opinion/editorialopinion/article/937726economic-growth-is-not-enough

Perhaps the most striking finding in the United Nations’ recent 20th anniversary Human Development Report is the outstanding performance of the Muslim countries of the Middle East and North Africa. Here was Tunisia, ranked sixth among 135 countries in terms of improvement in its Human Development Index (HDI) over the previous four decades, ahead of Malaysia, Hong Kong, Mexico, and India. Not far behind was Egypt, ranked 14th. The HDI is a measure of development that captures achievements in health and education alongside economic growth. Egypt and (especially) Tunisia did well enough on the growth front, but where they really shone was on these broader indicators. At 74, Tunisia’s life expectancy edges out Hungary’s and Estonia’s, countries that are more than twice as wealthy. Some 69 per cent of Egypt’s children are in school, a ratio that matches much richer Malaysia’s. Clearly, these were states that did not fail in providing social services or distributing the benefits of economic growth widely. Yet in the end it did not matter. The Tunisian and Egyptian people were, to paraphrase Howard Beale, mad as hell at their governments, and they were not going to take it anymore. If Tunisia’s Zine El Abidine Ben Ali or Egypt’s Hosni Mubarak were hoping for political popularity as a reward for economic gains, they must have been sorely disappointed. One lesson of the Arab annus mirabilis, then, is that good economics need not always mean good politics; the two can part ways for quite some time. It is true that the world’s wealthy countries are almost all democracies. But democratic politics is neither a necessary nor a sufficient condition for economic development over a period of several decades. Despite the economic advances they registered, Tunisia, Egypt, and many other Middle Eastern countries remained authoritarian countries ruled by a narrow group of cronies, with corruption, clientelism and nepotism running rife. These countries’ rankings on political freedoms and corruption stand in glaring contrast to their rankings on development indicators. In Tunisia, Freedom House reported prior to the Jasmine revolution, “the authorities continued to harass, arrest, and imprison journalists and bloggers, human rights activists, and political opponents of the government.” The Egyptian government was ranked 111th out of 180 countries in Transparency International’s 2009 survey of corruption. And of course, the converse is also true: India has been democratic since independence in 1947, yet the country didn’t begin to escape of its low “Hindu rate of growth” until the early 1980s. A second lesson is that rapid economic growth does not buy political stability on its own, unless political institutions are allowed to develop and mature rapidly as well. In fact, economic growth itself generates social and economic mobilization, a fundamental source of political instability. As the late political scientist Samuel Huntington put it more than 40 years ago, “social and economic change — urbanization, increases in literacy and education, industrialization, mass media expansion — extend political consciousness, multiply political demands, broaden political participation.” Now add social media such as Twitter and Facebook to the equation, and the destabilizing forces that rapid economic change sets into motion can become overwhelming. These forces become most potent when the gap between social mobilization and the quality of political institutions widens. When a country’s political institutions are mature, they respond to demands from below through a combination of accommodation, response and representation. When they are underdeveloped, they shut those demands out in the hope that they will go away — or be bought off by economic improvements. The events in the Middle East amply demonstrate the fragility of the second model. Protesters in Tunis and Cairo were not demonstrating about lack of economic opportunity or poor social services. They were rallying against a political regime that they felt was insular, arbitrary and corrupt, and that did not allow them adequate voice. A political regime that can handle these pressures need not be democratic in the western sense of the term. One can imagine responsive political systems that do not operate through free elections and competition among political parties. Some would point to Oman or Singapore as examples of authoritarian regimes that are durable in the face of rapid economic change. Perhaps so. But the only kind of political system that has proved itself over the long haul is that associated with western democracies. Which brings us to China. At the height of the Egyptian protests, Chinese Web surfers who searched the terms “Egypt” or “Cairo” were returned messages saying that no results could be found. Evidently, the Chinese government did not want its citizens to read up on the Egyptian protests and get the wrong idea. With the memory of the 1989 Tiananmen Square movement ever present, China’s leaders are intent on preventing a repeat. China is not Tunisia or Egypt, of course. The Chinese government has experimented with local democracy and has tried hard to crack down on corruption. Even so, protest has spread over the last decade. There were 87,000 instances of what the government calls “sudden mass incidents” in 2005, the last year that the government released such statistics, which suggests that the rate has since increased. Dissidents challenge the supremacy of the Communist Party at their peril. The Chinese leadership’s gamble is that a rapid increase in living standards and employment opportunities will keep the lid on simmering social and political tensions. That is why it is so intent on achieving annual economic growth of 8 per cent or higher — the magic number that it believes will contain social strife. But Egypt and Tunisia have just sent a sobering message to China and other authoritarian regimes around the world: don’t count on economic progress to keep you in power forever.

### Growth Bad – War

#### Expectations and need for resources make upswing wars comparatively worse

Nathan Mauer, economist, 1986, The Kondratieif Waves, p 197-8

The overall trend of the economy shapes perceptions as to its strength and direction. In a hull market, "experts" are almost uniformly optimistic; in a bear market the owlish analysts almost universally suggest caution. It is during the upward swings, soon after a trough and just before a peak, that wars become more likely. It should be noted that peak wars are the result of a different kind of socioeconomic psychological pressure and have quite different economic results than trough wars. Nations become socially and politically unsettled after a long period of boom and expansion, perhaps because in their final stages, peoples' expectations begin to outrun actual growth in the general level of prosperity. War then becomes the ultimate destination. Inasmuch as all nations arc attempting to expand simultaneously, the intense competition for resources and markets leads eventually to military confrontations, which become contagious. One explanation suggested is that during trough wars the public is still largely concerned with private considerations and their own wellbeing. They tend to be less interested in international disputes, world crusades, or campaigns involving large investment of cash, effort, and the nervous energy needed to pursue projects to a conclusion. Trough wars tend to be short. They are more a matter of choice and sudden decision by the stronger power. Inasmuch as peak wars are the result of frustration of expectations {usually with economic elements), peak wars tend to be more desperate, more widespread, and more destructive.

### Growth Bad – War

#### Economic growth is unsustainable and inevitably causes resource wars

Ted Trainer, Senior Lecturer in Sociology at the School of Social Work, University of New South Wales, July 2002, ssis.arts.unsw.edu.au/tsw/D62IfYouWantAffluence.html

As is the case with the other major problems confronting the planet, such as environmental destruction, it is essential to understand the problem of global peace and conflict from the "limits to growth" perspective. This analysis focuses on the fact that the present living standards of the rich countries involve levels of production and consumption that are grossly unsustainable. Just to note two of the lines of argument documented in the large literature from the limits perspective, if all 9 billion people likely to live on earth by 2070 were to have the present rich world lifestyle and "footprint" we would need about 12 times the area of productive land that exists on the entire planet. Secondly if we were to cut greenhouse gas emissions sufficiently to prevent the carbon content of the atmosphere from increasing any more world per capita energy consumption would have to be cut to about one-eighteenth of its present amount If all 9 billion people likely by 2070 were to have the present rich world per capita resource consumption, resource production would have to be about 8 times the present rate. These multiples underline the magnitude of the overshoot. Sustainability will require enormous reductions in the volume of rich world production and consumption. Yet its supreme goal is economic growth, i.e., to increase the levels of production and consumption and GDP, constantly, rapidly and without any limit. That the absurdity of this is never recognised in conventional economic and political circles defies understanding. If we in rich countries average 3% economic growth to 2070 and by then all the world’s people had risen to the "living standards’ we would have by then, the total world economic output would be 60 times as great as the present grossly unsustainable level. If this limits to growth analysis is at all valid the implications for the problem of global peace and conflict and security are clear and savage. If we all remain determined to increase our living standards, our level of production and consumption, in a world where resources are already scarce, where only a few have affluent living standards but another 8 billion will be wanting them too, and which we the rich are determined to get richer without any limit, then nothing is more guaranteed than that there will be increasing levels of conflict and violence. To put it another way, if we insist on remaining affluent we will need to remain heavily armed.

### AT: Transition Wars

#### Countries turn inward – solves transition wars

D. Scott Bennett, Ph.D., The U of Michigan, Distinguished prof of Political Science, and Timothy Nordstrom, Associate prof. Director of Graduate Studies @ U of Mississippi, February 2000, The Journal of Conflict Resolution, Vol. 44, No.1

INTERNAL CONDITIONS AND EXTERNAL BEHAVIOR: IMPROVEMENTS By coming at externalization from the substitutability perspective, we hope to deal with some of the theoretical problems raised by critics of diversionary conflict theory. Substitutability can be seen as a particular problem of model specification where the dependent variable has not been fully developed. We believe that one of the theoretical problems with studies of externalization has been a lack of attention to alternative choices; Bueno de Mesquita actually hints toward this (and the importance of foreign policy substitution) when he argues that it is shortsighted to conclude that a leader will uniformly externalize in response to domestic problems at the expense of other possi- ble policy choices (1985, 130). We hope to improve on the study of externalization and behavior within rivalries by considering multiple outcomes in response to domestic conditions.5 In particular, we will focus on the alternative option that instead of exter- nalizing, leaders may internalize when faced with domestic economic troubles. Rather than diverting the attention of the public or relevant elites through military action, leaders may actually work to solve their internal problems internally. Tying internal solutions to the external environment, we focus on the possibility that leaders may work to disengage their country from hostile relationships in the international arena to deal with domestic issues. Domestic problems often emerge from the challenges of spreading finite resources across many different issue areas in a manner that satisfies the public and solves real problems. Turning inward for some time may free up resources required to jump-start the domestic economy or may simply provide leaders the time to solve internal distributional issues. In our study, we will focus on the condition of the domestic economy (gross domes- tic product [GDP] per capita growth) as a source of pressure on leaders to externalize. We do this for a number of reasons. First, when studying rivalries, we need an indicator of potential domestic trouble that is applicable beyond just the United States or just advanced industrialized democracies. In many non-Western states, variables such as election cycles and presidential popularity are irrelevant. Economics are important to all countries at all times. At a purely practical level, GDP data is also more widely available (cross-nationally and historically) than is data on inflation or unemploy- ment.6 Second, we believe that fundamental economic conditions are a source of potential political problems to which leaders must pay attention. Slowing growth or worsening economic conditions may lead to mass dissatisfaction and protests down the road; economic problems may best be dealt with at an early stage before they turn into outward, potentially violent, conflict. This leads us to a third argument, which is that we in fact believe that it may be more appropriate in general to use indicators of latent conflict rather than manifest conflict as indicators of the potential to divert. Once the citizens of a country are so distressed that they resort to manifest conflict (rioting or engaging in open protest), it may be too late for a leader to satisfy them by engaging in distracting foreign policy actions. If indeed leaders do attempt to distract people's attention, then if protest reaches a high level, that attempt has actually failed and we are looking for correlations between failed externalization attempts and further diversion.

### AT: Growth Solves War

#### Leaders reduce rivalries to free up resources for the domestic economy

D. Scott Bennett and Timothy Nordstrom, profs of polis ci at penn state, February 2000, “Foreign Policy Substitutability and Internal Economic Problems in Enduring Rivalries,” Journal of Conflict Resolution, Ebsco.

In this analysis, we focus on using economic conditions to understand when rivalries are likely to escalate or end. Rivalries are an appropriate set of cases to use when examining substitutability both because leaders in rival states have clearly substitutable choices and because rivalries are a set of cases in which externalization is a particularly plausible policy option.7 In particular, when confronted with domestic problems, leaders in a rivalry have the clear alternatives of escalating the conflict with the rival to divert attention or to work to settle the rivalry as a means of freeing up a substantial amount of resources that can be directed toward solving internal problems. In the case of the diversion option, rivals provide logical, believable actors for leaders to target; the presence of a clear rival may offer unstable elites a particularly inviting target for hostile statements or actual conflict as necessary. The public and relevant elites already consider the rival a threat or else the rivalry would not have continued for an extended period; the presence of disputed issues also provides a casus belli with the rival that is always present. Rivals also may provide a target where the possible costs and risks of externalization are relatively controlled. If the goal is diversion, leaders willwant to divert attention without provoking an actual (and expensive)war. Over the course of many confrontations, rival states may learn to anticipate response patterns, leading to safer disputes or at least to leaders believing that they can control the risks of conflict when they initiate a new confrontation. In sum, rivals provide good targets for domestically challenged political leaders. This leads to our first hypothesis, which is as follows: Hypothesis 1: Poor economic conditions lead to diversionary actions against the rival. Conflict settlement is also a distinct route to dealing with internal problems that leaders in rivalries may pursue when faced with internal problems. Military competition between states requires large amounts of resources, and rivals require even more attention. Leaders may choose to negotiate a settlement that ends a rivalry to free up important resources that may be reallocated to the domestic economy. In a “guns versus butter” world of economic trade-offs, when a state can no longer afford to pay the expenses associated with competition in a rivalry, it is quite rational for leaders to reduce costs by ending a rivalry. This gain (a peace dividend) could be achieved at any time by ending a rivalry. However, such a gain is likely to be most important and attractive to leaders when internal conditions are bad and the leader is seeking ways to alleviate active problems. Support for policy change away from continued rivalry is more likely to develop when the economic situation sours and elites and masses are looking for ways to improve a worsening situation. It is at these times that the pressure to cut military investment will be greatest and that state leaders will be forced to recognize the difficulty of continuing to pay for a rivalry. Among other things, this argument also encompasses the view that the cold war ended because the Union of Soviet Socialist Republics could no longer compete economically with the United States. Hypothesis 2: Poor economic conditions increase the probability of rivalry termination. Hypotheses 1 and 2 posit opposite behaviors in response to a single cause (internal economic problems). As such, they demand a research design that can account for substitutability between them.

#### Economic decline doesn’t cause war

Daniel Deudney, Hewlett Fellow in Science, Technology, and Society at the Center for Energy and Environmental Studies, Princeton, 1991, Bulletin of the Atomic Scientists, Ebsco

Poverty Wars. In a second scenario, declining living standards first cause internal turmoil. then war. If groups at all levels of affluence protect their standard of living by pushing deprivation on other groups class war and revolutionary upheavals could result. Faced with these pressures, liberal democracy and free market systems could increasingly be replaced by authoritarian systems capable of maintaining minimum order.9 If authoritarian regimes are more war-prone because they lack democratic control, and if revolutionary regimes are warprone because of their ideological fervor and isolation, then the world is likely to become more violent. The record of previous depressions supports the proposition that widespread economic stagnation and unmet economic expectations contribute to international conflict. Although initially compelling, this scenario has major flaws. One is that it is arguably based on unsound economic theory. Wealth is formed not so much by the availability of cheap natural resources as by capital formation through savings and more efficient production. Many resource-poor countries, like Japan, are very wealthy, while many countries with more extensive resources are poor. Environmental constraints require an end to economic growth based on growing use of raw materials, but not necessarily an end to growth in the production of goods and services. In addition, economic decline does not necessarily produce conflict.How societies respond to economic decline may largely depend upon the rate at which such declines occur. And as people get poorer, they may become less willing to spend scarce resources for military forces. As Bernard Brodie observed about the modein era, “The predisposing factors to military aggression are full bellies, not empty ones.”’” The experience of economic depressions over the last two centuries may be irrelevant, because such depressions were characterized by under-utilized production capacity and falling resource prices. In the 1930 increased military spending stimulated economies, but if economic growth is retarded by environmental constraints, military spending will exacerbate the problem. Power Wars. A third scenario is that environmental degradation might cause war by altering the relative power of states; that is, newly stronger states may be tempted to prey upon the newly weaker ones, or weakened states may attack and lock in their positions before their power ebbs firther. But such alterations might not lead to war as readily as the lessons of history suggest, because economic power and military power are not as tightly coupled as in the past. The economic power positions of Germany and Japan have changed greatly since World War 11, but these changes have not been accompanied by war or threat of war. In the contemporary world, whole industries rise, fall, and relocate, causing substantialfluctuations in the economic well-being of regions and peoples without producing wars.There is no reason to believe that changes in relative wealth and power caused by the uneven impact of environmental degradation would inevitably lead to war. Even if environmental degradation were to destroy the basic social and economic fabric of a country or region, the impact on international order may not be very great. Among the first casualties in such country would be the capacity to wage war.The poor and wretched of the earth may be able to deny an outside aggressor an easy conquest, but they are themselves a minimal threat to other states.Contemporary offensive military operations require complex organizational skills, specialized industrial products and surplus wealth.

### AT: Interdependence

#### Interdependence increases war by increasing the risk of resource conquests

Tan Tan Yee, Journal of the Singapore Armed Forces, Jan-Mar 1999, http://www.mindef.gov.sg/safti/pointer/back/journals/1999/Vol25\_1/7.htm

Conversely, the realist view is that *ceteris paribus*, highly interdependent states are more likely to go to war with each other. Ironically, like liberals, realists also accept that economic interdependence is generally mutually beneficial to both parties. However, they argue that the security perspective of a state is rarely if ever defined solely in economic terms. In fact, states concerned with their security will want to avoid becoming too dependent in the first place, as it could mean imported goods being cut off in a crisis.20 This is particularly so for crucial imports like oil or raw materials, without which most modern economies would collapse. Consequently, it is argued that the more militarily powerful states have an increased incentive to go to war in order to assure themselves of continued access to vital goods. Such a course of action pre-supposes that there are no alternative supplies of the particular good from other sources or that the adjustment costs of doing so will be too high; otherwise, war may not be the most viable option. Kenneth Waltz puts across the point succinctly: whilst in theory states have little reason to fear the dependence that goes with specialisation and international trade, the anarchic structure of international politics engenders in states a heightened sense of vulnerability. This fosters the desire in states to constantly seek to increase the span of control and lessen the extent of their dependency.21 In fact, one can trace the roots of the modern realist's understanding of economic interdependence and war to the advent of imperialism in the 18th century. Imperialistic expansion and the acquisition of colonies by major colonial powers can be traced to the states' desire to secure ever-greater control over sources of supply and markets for its goods. In other words, the colonial empires were striving to reduce their fears and dependence on external specialization by increasing internal specialization within a now larger political realm.22

### AT: Diversionary Wars

#### Even if diversionary conflicts occur they won’t escalate.

D. Scott Bennett and Timothy Nordstrom, profs of polis ci at penn state, February 2000, “Foreign Policy Substitutability and Internal Economic Problems in Enduring Rivalries,” Journal of Conflict Resolution, Ebsco.

When engaging in diversionary actions in response to economic problems, leaders will be most interested in a cheap, quick victory that gives them the benefit of a rally effect without suffering the long-term costs (in both economic and popularity terms) of an extended confrontation or war. This makes weak states particularly inviting targets for diversionary action since they may be less likely to respond than strong states and because any response they make will be less costly to the initiator. Following Blainey (1973),a state facing poor economic conditions may in fact be the target of an attack rather than the initiator. This may be even more likely in the context of a rivalry because rival states are likely to be looking for any advantage over their rivais. Leaders may hope to catch an economically challenged rival looking inward in response to a slowing economy. Following the strategic application of diversionary conflict theory and states' desire to engage in only cheap conflicts for diversionary purposes, states should avoid conflict initiation against target states experiencing economic problems.

## Nuclear War

### 2NC NW Doesn’t Cause Extinction

#### No extinction from nuke war – reduced arsenals and our models are robust even for the worst situation.

Brian Dunning, Computer Scientist and award-winning science writer/blogger, 2011, “Nuclear War and Nuclear Winter,” Skeptoid #244, Feb 8, http://skeptoid.com/episodes/4244

Other cataclysmic events have proven that the nuclear winter scenario is not at all far-fetched. The eruption of Mt. Pinatubo in the Philippines, also in 1991, threw some 17 million tons of particulates into the upper atmosphere that caused global temperatures to drop by about a degree for several months. Sunlight dropped by 10%. This temperature drop did not, however, have any long-term effect on agriculture. Pinatubo was only a blip compared the the K-T extinction event of some 65 million years ago, when a theorized asteroid hit us with one hundred million megatons of destructive force, lighting virtually the entire world on fire. The evidence of this is called the K-T boundary, a layer of clay found all around the world. Sunlight was reduced by 10-20% for ten years, which caused a massive cascading extinction of species from plants to herbivores to carnivores. $2/mo $5/mo $10/mo One time But we shouldn't expect anything like this to happen from a nuclear war. Times continue to change, including the nature of warfare. Nations no longer stockpile the megaton class weapons popular in the 1950s and 1960s; typical yields now are a fraction of a megaton. The United States' conventional capability is now so good that it can effectively destroy an entire nation's ability to wage large-scale war overnight, using only conventional weapons. But that doesn't mean the nuclear forces are no longer needed. Should a superpower strike first against the United States with nuclear weapons, the response would more than likely be nuclear, bringing Mutually Assured Destruction into play. But what about a small nation striking first? What about nukes in the trunks of cars parked in major cities? In the modern era, it's much less clear that any superpower would necessarily have anyone to shoot back at. Increasingly, non-superpower nations are building nuclear stockpiles. India and Pakistan might get into it with one another. Israel's foes might surprise it with nuclear weapons. Who knows what North Korea and Iran might do. Smaller regional nuclear wars remain a very real possibility. According to the worst-case estimates in the TTAPS papers, about one million tons of smoke would be expected from the fires resulting from each nuclear strike. And these smaller regional nuclear combats are expected to use about 50 nuclear weapons (compare this to 150 nuclear weapons for a broader global nuclear war). Thus, today's most likely nuclear scenario would be expected to produce climate effects similar to three Pinatubo events, according to the worst estimates, and still many orders of magnitude less than the K-T extinction. And so, while the nuclear winter scenario is a good prediction of the effects of a worst-case scenario, when all the variables are at their least favorable, the strongest probabilities favor a much less catastrophic nuclear autumn; and even those effects depend strongly on variables like whether the war happens during the growing season. A bomb in Los Angeles might result in history's worst firestorm, while a bomb in the mountains of Pakistan might create no fires at all. The simple fact is that there are too many unpredictable variables to know what kind of climate effects the smoke following nuclear fires will produce, until it actually happens. Obviously we're all very mindful of the many terrible implications of nuclear combat, and if it ever happens, the prospect of a nuclear autumn will likely be among the least of our concerns. The physicist Freeman Dyson perhaps described it best when he said "(TTAPS is) an absolutely atrocious piece of science, but I quite despair of setting the public record straight... Who wants to be accused of being in favor of nuclear war?"

## Growth Bad – China

### Growth Bad – China

#### Growth will make China aggressive – that causes war

Charles Boehmer, Ph.D Pennsylvania State U in IR, associate prof @ U of Texas at El Paso, Defence and Peace Economics, Vol. 21(3), June 2010, pp.249-268, EBSCO

The contribution of this article has been to examine propositions about economic growth in a global study. Most existing studies on this topic focus on only the United States, samples of countries that are more developed on average (due to data availability in the past), or are based on historical information and not economic GDP data. While I have shown that there is no strong evidence linking military expenditures to violent interstate conflicts at the state level of 12 If one divides the sample between major and minor powers, the effect of GDP growth affects positively participation in Fatal MIDs by both major and minor powers, although the effect is stronger for minor powers. The opposite is true, however, for participation in wars, where the effect of GDP growth is stronger for major powers relative to minor powers. analysis, much of the remaining Growth-as-Catalyst perspective is grounded in propositions that are not directly germane to questions about state conflict behavior, such as those linking state behavior to long-cycles, or those that remain at the systemic level. What answer remains linking economic growth to war once we eliminate military expenditures as an explanation? Considering that the concept of foreign policy mood is difficult to identify and measure, and that the bulk of the literature relies solely on the American historical experience, I do not rely on that concept. It is still possible that such moods affect some decision-makers. Instead, similar to Blainey, I find that economic growth, when sustained over a stretch of years, has its strongest effect on states once they find themselves in an international crisis. The results of this study suggest that states such as China, which have a higher level of opportunity to become involved in violent interstate conflicts due to their capabilities, geographic location, history of conflict, and so on, should also have a higher willingness to fight after enjoying multiple years of recent economic growth. One does not have to assume that an aggressive China will emerge from growth. If conflicts do present themselves, then China may be more likely to escalate a war given its recent national performance. Future research is necessary on the relationship between economic growth and violent interstate conflicts. This study shows that sustained economic growth is generally related to state participation in war and other violent disputes. Evidence here also supports the proposition that economic growth increases the resolve of states to reciprocate threats and uses of force. The next steps in this project will examine whether economic growth affects strategic behavior between states, which necessitates an extension on the theory presented here. In addition, the results of this study suggest that regions containing numerous growing states may be at more risk of experiencing conflict and war. This is also a relevant issue for future research

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## Growth Bad – Terrorism

### Growth Bad – Terrorism

#### Growth creates terrorists – empirically proven – all the big guns are loaded

Michael Radu, senior fellow at the Foreign Policy Research Institute Ph.D, 7-9-2002, “The futile search for “root causes” of Terrorism”, “http://www.unc.edu/depts/diplomat/archives\_roll /2002\_07-09 /radu\_futile/radu\_futile.html”

Those who hold to "poverty as the root cause" do so even though the data does not fit their model. Even leaving aside multimillionaire Osama bin Laden, the backgrounds of the September 11 killers indicates that they were without exception scions of privilege: all were either affluent Saudis and Egyptians, citizens of the wealthy Gulf statelets, or rich sons of Lebanon, trained in and familiar with the ways of the West—not exactly the victims of poverty in Muslim dictatorships. Many poor Egyptians, Moroccans, and Palestinians may support terrorists, but they do not—and cannot—provide them with recruits. In fact, Al Qaeda has no use for illiterate peasants. They cannot participate in World Trade Center-like attacks, unable as they are to make themselves inconspicuous in the West and lacking the education and training terrorist operatives need.

## AT: Growth Good – Random

### AT: Growth Good – Happiness

#### Were past the point where growth can contribute to happiness

Gareth Dale, Director of Postgraduate Research Politics and History, Brunel University, 3-27-2012, “The growth paradigm: a critique,” International Socialism, Issue 134, http://www.isj.org.uk/index.php4?id=798&issue=134

Alongside environmental concerns, a second source of growth scepticism has been the perceived disconnect between economic growth and social well-being. Yardsticks such as the UN Human Development Index (HDI) and the Genuine Progress Indicator (GPI) have been developed to estimate well-being, as alternatives to GDP. Such indices are inherently inexact because, almost by definition, key aspects of the quality of life can’t be measured.75 Nonetheless, their findings are significant and chime with abundant anecdotal evidence. For example, if measured by GPI, well-being improved continuously in the US and Britain from 1950 until 1976, but has declined ever since—in contrast to steadily-rising GDP.76 Doctors, judges and barristers, whose earnings have more than doubled in real terms since 1978, may find that implausible, but those in occupations such as forklift truck driving, packing and bottling, and baking, in which incomes have fallen over the same period, will not.77 In hindsight, the Sex Pistols’ 1977 chorus of “No Future” seems less like a nihilistic rant than a scientific prediction, for whereas “Britain” has become steadily “wealthier” ever since, with GDP nearly doubling, living standards for millions have stagnated or declined. The relationship between GDP per head and well-being is limited, and such correlation between them as does exist tends to decline after a certain point—as a rule of thumb, when per capita GDP exceeds $15,000. Material wealth can be an important determinant of living conditions and the quality of life, but the relationship is contingent. Amartya Sen points out that in 20th century Britain the decades of slow GDP growth were those in which life expectancy increased especially rapidly (1910s, 1940s). This attests to “changes in the extent of social sharing during the war decades, and the sharp increases in public support for social services (including nutritional support and healthcare) that went with this”.78 Others have shown that although life expectancy tends to correlate with GDP per head, this is due to the impact of GDP on the incomes of the poor and on public expenditure (notably healthcare). Once these variables are included on their own in the statistical exercise, little extra explanation is obtained by including GDP as an additional causal influence.79 The most impressive recent contribution to this field of inquiry is Richard Wilkinson’s and Kate Pickett’s best-seller, The Spirit Level. Its principal thesis is simple: as national income increases beyond a certain level it ceases to translate into improvements in health or happiness. Instead the critical variable is the degree of equality. Deploying an impressive body of evidence The Spirit Level demonstrates that income inequality varies inversely with levels of trust, life expectancy, children’s educational performance and social mobility, and directly with rates of homicide, imprisonment, mental illness, alcohol addiction, infant mortality, obesity and length of working hours, not to mention spending on advertising. The level of these social ills is much higher in unequal societies than in more equal ones. The authors suggest that by exacerbating the importance attributed to one’s ranking in the status hierarchy, greater inequality heightens our anxieties about how other people rank us. We come to see social position as a more important feature of our identity—those at the top feel insecure; those at the bottom feel devalued and demeaned. The resulting perceptions of competition and threat, and feelings of inferiority, create individuals who are less empathetic and more aggressive. Inequality, in short, breeds all manner of social ills. The Spirit Level efficiently rebuts both of the other major arguments in favour of (rich-nation) economic growth, namely that it provides the means by which radically to reduce poverty, and that rising GDP is an indispensable precondition of human flourishing. With respect to the rich countries these arguments, it shows convincingly, must be severely qualified. Although few countries today combine a satisfactory quality of life (defined as above 0.8 on the HDI scale) with an ecological footprint that is globally sustainable, one or two do so, and several others come within a whisker, demonstrating that such a balance can be achieved—and if carbon-reducing technologies are made widely available it is well within the means of human endeavour worldwide. It is worth recalling that average world GDP, at $6,000 per head, is now greater than the average for the West in 1950.80 “It is fortunate”, Wilkinson and Pickett conclude, that “just when the human species discovers that the environment cannot absorb further increases in emissions, we also learn that further economic growth in the developed world no longer improves health, happiness or well-being”.81

### AT: Growth Good – Happiness

#### Growth doesn’t result in happiness – statistics, philosophy, relative status, and psychology

M. H. Huesemann, Marine Sciences Laboratory, Pacific Northwest National Laboratory, 2008, “Will progress in science and technology avert or accelerate global collapse? A critical analysis and policy recommendations,” Environ Dev Sustain (2008) 10:787–825, Springer.

However, there is a paradox: while higher relative income of individuals is associated with greater subjective well-being at any given point in time, an increase in average affluence of entire nations (i.e., per capita GDP) over extended time periods has yielded no significant gains in happiness. For example, although personal income in the U.S. quadrupled from 1930 to 1990, the proportion of people considering themselves ‘‘very happy’’ remained more or less constant (around 33%) during the same time period (Myers & Diener, 1996). Despite the fact that per capita income in Japan rose six-fold from 1958 to 1991, the average life satisfaction rating remained constant (Frey & Stutzer, 2002). Similar results have been reported for other industrialized nations (Diener & Oishi, 2000). Clearly, the key utilitarian assumption upon which our economic system is based, namely that more economic growth and ever rising affluence will increase well-being and happiness, is false and in serious need of revision. There are at least three reasons for this paradox: 1. As Aristotle pointed out more than two thousand years ago, human desires are by their very nature insatiable (Lane, 2001). Shortly after a material desire has been fulfilled, a sense of dissatisfaction soon develops resulting in further craving. This mechanism can be described in standard economic terms (Samuelson & Nordhaus, 1989): as long as an object is unavailable and scarce, it has high value and we strive for it, expecting to gain happiness from its possession. But as soon as we have obtained the desired object, it is no longer scarce, and thereby becomes less valuable and less able to generate happiness. We then repeat this cycle by selecting another scarce item for which we strive, unfortunately without ever finding lasting fulfillment or contentment. 2. As was pointed out earlier, it is to a large degree relative rather than absolute income that determines one’s social position as well as feelings of achievement and superiority. This accounts for the fact that a large fraction of income, at least 50% or more (Jackson & Marks, 1999), is spent on competitive, or in Thorstein Veblen’s words, conspicuous consumption (Frey & Stutzer, 2002; Schor, 1992). The problem is that consumption of positional goods looses its ability to raise social status as soon as many others are able to purchase the same status symbols. As long as the relative income distribution remains more or less constant, increasing average affluence (per capita GDP) will not enhance an individual’s social position or the sense of well-being derived from it. The end result is that people, like addicts, are caught on a hedonic, positional treadmill (Lane, 2001; Schor, 1992), consuming ever more status symbols, thereby raising total consumption of goods and services (per capita GDP) without obtaining greater happiness. 3. Finally, the frantic pursuit of materialism deprives people of opportunities to receive more meaningful satisfaction from the numerous social, cultural, and spiritual activities that are well known to promote happiness and feelings of wellbeing. As a result, individuals possessing strong materialistic values generally experience low life-satisfaction and often exhibit symptoms of low self-esteem, depression, anxiety, somatic ailments, personality disorders, antisocial or addictive behavior (Kasser, 2002). The fact that material consumption above levels required to meet basic needs fails to increase subjective well-being not only deprives neoclassical economists of their key justification for promoting continuous economic growth but at the same time provides favorable data for those concerned with achieving societal sustainability and preventing collapse (Jackson, 2005). It appears that a reduction and stabilization in average affluence (per capita GDP) will not seriously affect human happiness as long as basic needs can be met, the relative income distribution remains about the same, and people learn to exhibit their social status in non-consumptive ways. In fact, given that a reduction in production and consumption would release more time and energy for the pursuit of other social, cultural, and spiritual activities known to substantially increase subjective wellbeing, it is possible that life in a steady-state economy where material consumption is reduced to more sustainable levels might be considerably more enjoyable.

### AT: Growth Good – Singularity

#### No singularity – exponential advances don’t occur in the right fields

Paul G. Allen, cofounded Microsoft, chairman of Vulcan, which invests in an array of technology, aerospace, entertainment, and sports businesses, and Mark Greaves, computer scientist who serves as Vulcan's director for knowledge systems, 10-12-2011, “Paul Allen: The Singularity Isn't Near,” Technology Review, http://www.technologyreview.com/view/425733/paul-allen-the-singularity-isnt-near/

Kurzweil's reasoning rests on the Law of Accelerating Returns and its siblings, but these are not physical laws. They are assertions about how past rates of scientific and technical progress can predict the future rate. Therefore, like other attempts to forecast the future from the past, these "laws" will work until they don't. More problematically for the singularity, these kinds of extrapolations derive much of their overall exponential shape from supposing that there will be a constant supply of increasingly more powerful computing capabilities. For the Law to apply and the singularity to occur circa 2045, the advances in capability have to occur not only in a computer's hardware technologies (memory, processing power, bus speed, etc.) but also in the software we create to run on these more capable computers. To achieve the singularity, it isn't enough to just run today's software faster. We would also need to build smarter and more capable software programs. Creating this kind of advanced software requires a prior scientific understanding of the foundations of human cognition, and we are just scraping the surface of this. This prior need to understand the basic science of cognition is where the "singularity is near" arguments fail to persuade us. It is true that computer hardware technology can develop amazingly quickly once we have a solid scientific framework and adequate economic incentives. However, creating the software for a real singularity-level computer intelligence will require fundamental scientific progress beyond where we are today. This kind of progress is very different than the Moore's Law-style evolution of computer hardware capabilities that inspired Kurzweil and Vinge. Building the complex software that would allow the singularity to happen requires us to first have a detailed scientific understanding of how the human brain works that we can use as an architectural guide, or else create it all de novo. This means not just knowing the physical structure of the brain, but also how the brain reacts and changes, and how billions of parallel neuron interactions can result in human consciousness and original thought. Getting this kind of comprehensive understanding of the brain is not impossible. If the singularity is going to occur on anything like Kurzweil's timeline, though, then we absolutely require a massive acceleration of our scientific progress in understanding every facet of the human brain. But history tells us that the process of original scientific discovery just doesn't behave this way, especially in complex areas like neuroscience, nuclear fusion, or cancer research. Overall scientific progress in understanding the brain rarely resembles an orderly, inexorable march to the truth, let alone an exponentially accelerating one. Instead, scientific advances are often irregular, with unpredictable flashes of insight punctuating the slow grind-it-out lab work of creating and testing theories that can fit with experimental observations. Truly significant conceptual breakthroughs don't arrive when predicted, and every so often new scientific paradigms sweep through the field and cause scientists to reëvaluate portions of what they thought they had settled. We see this in neuroscience with the discovery of long-term potentiation, the columnar organization of cortical areas, and neuroplasticity. These kinds of fundamental shifts don't support the overall Moore's Law-style acceleration needed to get to the singularity on Kurzweil's schedule. The Complexity Brake The foregoing points at a basic issue with how quickly a scientifically adequate account of human intelligence can be developed. We call this issue the complexity brake. As we go deeper and deeper in our understanding of natural systems, we typically find that we require more and more specialized knowledge to characterize them, and we are forced to continuously expand our scientific theories in more and more complex ways. Understanding the detailed mechanisms of human cognition is a task that is subject to this complexity brake. Just think about what is required to thoroughly understand the human brain at a micro level. The complexity of the brain is simply awesome. Every structure has been precisely shaped by millions of years of evolution to do a particular thing, whatever it might be. It is not like a computer, with billions of identical transistors in regular memory arrays that are controlled by a CPU with a few different elements. In the brain every individual structure and neural circuit has been individually refined by evolution and environmental factors. The closer we look at the brain, the greater the degree of neural variation we find. Understanding the neural structure of the human brain is getting harder as we learn more. Put another way, the more we learn, the more we realize there is to know, and the more we have to go back and revise our earlier understandings. We believe that one day this steady increase in complexity will end—the brain is, after all, a finite set of neurons and operates according to physical principles. But for the foreseeable future, it is the complexity brake and arrival of powerful new theories, rather than the Law of Accelerating Returns, that will govern the pace of scientific progress required to achieve the singularity. So, while we think a fine-grained understanding of the neural structure of the brain is ultimately achievable, it has not shown itself to be the kind of area in which we can make exponentially accelerating progress. But suppose scientists make some brilliant new advance in brain scanning technology. Singularity proponents often claim that we can achieve computer intelligence just by numerically simulating the brain "bottom up" from a detailed neural-level picture. For example, Kurzweil predicts the development of nondestructive brain scanners that will allow us to precisely take a snapshot a person's living brain at the subneuron level. He suggests that these scanners would most likely operate from inside the brain via millions of injectable medical nanobots. But, regardless of whether nanobot-based scanning succeeds (and we aren't even close to knowing if this is possible), Kurzweil essentially argues that this is the needed scientific advance that will gate the singularity: computers could exhibit human-level intelligence simply by loading the state and connectivity of each of a brain's neurons inside a massive digital brain simulator, hooking up inputs and outputs, and pressing "start." However, the difficulty of building human-level software goes deeper than computationally modeling the structural connections and biology of each of our neurons. "Brain duplication" strategies like these presuppose that there is no fundamental issue in getting to human cognition other than having sufficient computer power and neuron structure maps to do the simulation.[2] While this may be true theoretically, it has not worked out that way in practice, because it doesn't address everything that is actually needed to build the software. For example, if we wanted to build software to simulate a bird's ability to fly in various conditions, simply having a complete diagram of bird anatomy isn't sufficient. To fully simulate the flight of an actual bird, we also need to know how everything functions together. In neuroscience, there is a parallel situation. Hundreds of attempts have been made (using many different organisms) to chain together simulations of different neurons along with their chemical environment. The uniform result of these attempts is that in order to create an adequate simulation of the real ongoing neural activity of an organism, you also need a vast amount of knowledge about the functional role that these neurons play, how their connection patterns evolve, how they are structured into groups to turn raw stimuli into information, and how neural information processing ultimately affects an organism's behavior. Without this information, it has proven impossible to construct effective computer-based simulation models. Especially for the cognitive neuroscience of humans, we are not close to the requisite level of functional knowledge. Brain simulation projects underway today model only a small fraction of what neurons do and lack the detail to fully simulate what occurs in a brain. The pace of research in this area, while encouraging, hardly seems to be exponential. Again, as we learn more and more about the actual complexity of how the brain functions, the main thing we find is that the problem is actually getting harder. The AI Approach Singularity proponents occasionally appeal to developments in artificial intelligence (AI) as a way to get around the slow rate of overall scientific progress in bottom-up, neuroscience-based approaches to cognition. It is true that AI has had great successes in duplicating certain isolated cognitive tasks, most recently with IBM's Watson system for Jeopardy! question answering. But when we step back, we can see that overall AI-based capabilities haven't been exponentially increasing either, at least when measured against the creation of a fully general human intelligence. While we have learned a great deal about how to build individual AI systems that do seemingly intelligent things, our systems have always remained brittle—their performance boundaries are rigidly set by their internal assumptions and defining algorithms, they cannot generalize, and they frequently give nonsensical answers outside of their specific focus areas. A computer program that plays excellent chess can't leverage its skill to play other games. The best medical diagnosis programs contain immensely detailed knowledge of the human body but can't deduce that a tightrope walker would have a great sense of balance. Why has it proven so difficult for AI researchers to build human-like intelligence, even at a small scale? One answer involves the basic scientific framework that AI researchers use. As humans grow from infants to adults, they begin by acquiring a general knowledge about the world, and then continuously augment and refine this general knowledge with specific knowledge about different areas and contexts. AI researchers have typically tried to do the opposite: they have built systems with deep knowledge of narrow areas, and tried to create a more general capability by combining these systems. This strategy has not generally been successful, although Watson's performance on Jeopardy! indicates paths like this may yet have promise. The few attempts that have been made to directly create a large amount of general knowledge of the world, and then add the specialized knowledge of a domain (for example, the work of Cycorp), have also met with only limited success. And in any case, AI researchers are only just beginning to theorize about how to effectively model the complex phenomena that give human cognition its unique flexibility: uncertainty, contextual sensitivity, rules of thumb, self-reflection, and the flashes of insight that are essential to higher-level thought. Just as in neuroscience, the AI-based route to achieving singularity-level computer intelligence seems to require many more discoveries, some new Nobel-quality theories, and probably even whole new research approaches that are incommensurate with what we believe now. This kind of basic scientific progress doesn't happen on a reliable exponential growth curve. So although developments in AI might ultimately end up being the route to the singularity, again the complexity brake slows our rate of progress, and pushes the singularity considerably into the future. The amazing intricacy of human cognition should serve as a caution to those who claim the singularity is close. Without having a scientifically deep understanding of cognition, we can't create the software that could spark the singularity. Rather than the ever-accelerating advancement predicted by Kurzweil, we believe that progress toward this understanding is fundamentally slowed by the complexity brake. Our ability to achieve this understanding, via either the AI or the neuroscience approaches, is itself a human cognitive act, arising from the unpredictable nature of human ingenuity and discovery. Progress here is deeply affected by the ways in which our brains absorb and process new information, and by the creativity of researchers in dreaming up new theories. It is also governed by the ways that we socially organize research work in these fields, and disseminate the knowledge that results. At Vulcan and at the Allen Institute for Brain Science, we are working on advanced tools to help researchers deal with this daunting complexity, and speed them in their research. Gaining a comprehensive scientific understanding of human cognition is one of the hardest problems there is. We continue to make encouraging progress. But by the end of the century, we believe, we will still be wondering if the singularity is near.

### AT: Growth Good – Singularity

#### No singularity – hard limits to computing power and trends don’t hold for the long run

Simon Stevens, The University Of Birmingham, Honor in Computer Science, 2-22-2011, “The flaw with the future,” http://simonpstevens.com/News/FlawWithTheFuture

I've recently been reading Ray Kurzweil's The Singularity is Near. Kurzweil is a futurist and he most well known for his work on a prediction made of the near future called the technological singularity. First named as such by Vernor Vinge, and combined with something Kurzweil calls "the law of accelerating returns" he believes that technological progress is going to continually increase it's rate of improvement until sometime in the mid 21st century we will create an intelligence superior to our own. Following this we will experience a rate of technological progress so explosive that it can be considered a singularity. Borrowing the term from physics a technological singularity, like it's physical counterpart, has an event horizon beyond which the rules change so drastically predictions become near impossible. Kurzweil considers this most likely to be triggered by an artificial intelligence surpassing human capability. Such an intelligence would have the knowledge and ability to design improved versions of itself at an ever increasing rate. In the earlier chapters Kurzweil looks at the history of technological progress. When he graphs the rate of progress against a logarithmic time axis the major paradigm shifts of history appear to be happening closer and closer together. Kurzweil uses this graph to predict future innovation. Graph of history paradigm shifts The major problem I have this is that all of Kurzweil's predictions are based on extrapolating exponential growth. Extrapolation is all very well within a short time frame, but exponential growth in physical systems is usually restricted within limits. In a such a system the negative feedback may also be growing exponentially which means although initially it may be too small to be noticed, after the growth passes some boundary the negative feedback becomes relevant and the overall growth is no longer exponential. It's far more likely that the growth curve is sigmoid, and that we are simply at the early growth phase of the graph. Unfortunately it's impossible to tell where we are on the growth graph. Kurzweil makes the implicit assumption we are at the beginning of the growth curve and we have a significant distance to go before growth starts to slow. We could be at the centre where the negative feedback is about to overtake. There will be limits. The speed of light could be a hard limit on computing speed, or ultimately heat-death could be the hard limit, but there is a limit somewhere, and it will likely come a lot sooner that the heat-death of the universe. At some point we will reach a level of complexity where the negative feedback inherent in the complexity itself will overwhelm the forward growth. The question is how close are we to the limit and that is something we are only likely to know when we reach it. Kurzweil does actually discuss negative feedback in chapter two of his book and counters with the suggestion that it is not just one technology that is experiencing exponential growth, but many. As each old technology follows a sigmoid growth pattern and it's growth starts to slow, multiple new ones are ramping up to take it's place. He claims that this allows the growth of the overall system to remain exponential. What he doesn't consider however is that while he has taken feedback into account on a single tech scale, he has ignored the likelihood of feedback on a universal system scale. As the number of related technologies increase so do the number of interconnected nodes between these technologies. As areas of research become more related the complexity of the progression as a whole will start to experience feedback. Lets be clear on this, I'm not saying that Kurzweil's predictions are wrong, or that they won't happen, what I'm saying is that exponential growth cannot and will not continue indefinitely. If you make predictions about the future based on exponential growth you are also making an implicit prediction that the exponential growth in your subject will continue at least to the point of your prediction. In The Singularity Is Near Kurzweil makes a prediction of 2045 for the creation of true, strong, human level AI. The prediction itself describes explosive growth following the date of the singularity trigger event. I concur that following development of strong AI it does indeed seem likely that there will be a period of increased growth rate as the AI builds and expands on what humans were previously capable of, but the assertion that exponential growth will continue from now up until the singularity event seems founded on nothing more than Kurzweil's desire to witness this event for himself. The problem I have with Kurzweil is that he touts his prediction of the technological singularity as a scientific and accurate prediction, but it's not. It's scientific up to the point of making predictions from a trending system, but as to whether that trend will continue or not is entirely down to guess work. Extrapolating vastly beyond your data points is not valid science. The further you move from your measured data the more uncertainty you bring.

## Aff

### Yes Transition

#### We’re on the verge of a global consciousness shift towards biospheric empathy-makes growth environmentally sustainable and solves every impact-collapse now destroys the transition

Jeremy Rifkin, President of the Foundation on Economic Trends, 1-11-2010, “'The Empathic Civilization': Rethinking Human Nature in the Biosphere Era,” Huffington Post, http://www.huffingtonpost.com/jeremy-rifkin/the-empathic-civilization\_b\_416589.html

Recent discoveries in brain science and child development, however, are forcing us to rethink these long-held shibboleths about human nature. Biologists and cognitive neuroscientists are discovering mirror-neurons--the so-called empathy neurons--that allow human beings and other species to feel and experience another's situation as if it were one's own. We are, it appears, the most social of animals and seek intimate participation and companionship with our fellows. Social scientists, in turn, are beginning to reexamine human history from an empathic lens and, in the process, discovering previously hidden strands of the human narrative which suggests that human evolution is measured not only by the expansion of power over nature, but also by the intensification and extension of empathy to more diverse others across broader temporal and spatial domains. The growing scientific evidence that we are a fundamentally empathic species has profound and far-reaching consequences for society, and may well determine our fate as a species. What is required now is nothing less than a leap to global empathic consciousness and in less than a generation if we are to resurrect the global economy and revitalize the biosphere. The question becomes this: what is the mechanism that allows empathic sensitivity to mature and consciousness to expand through history? The pivotal turning points in human consciousness occur when new energy regimes converge with new communications revolutions, creating new economic eras. The new communications revolutions become the command and control mechanisms for structuring, organizing and managing more complex civilizations that the new energy regimes make possible. For example, in the early modern age, print communication became the means to organize and manage the technologies, organizations, and infrastructure of the coal, steam, and rail revolution. It would have been impossible to administer the first industrial revolution using script and codex. Communication revolutions not only manage new, more complex energy regimes, but also change human consciousness in the process. Forager/hunter societies relied on oral communications and their consciousness was mythologically constructed. The great hydraulic agricultural civilizations were, for the most part, organized around script communication and steeped in theological consciousness. The first industrial revolution of the 19th century was managed by print communication and ushered in ideological consciousness. Electronic communication became the command and control mechanism for arranging the second industrial revolution in the 20th century and spawned psychological consciousness. Each more sophisticated communication revolution brings together more diverse people in increasingly more expansive and varied social networks. Oral communication has only limited temporal and spatial reach while script, print and electronic communications each extend the range and depth of human social interaction. By extending the central nervous system of each individual and the society as a whole, communication revolutions provide an evermore inclusive playing field for empathy to mature and consciousness to expand. For example, during the period of the great hydraulic agricultural civilizations characterized by script and theological consciousness, empathic sensitivity broadened from tribal blood ties to associational ties based on common religious affiliation. Jews came to empathize with Jews, Christians with Christians, Muslims with Muslims, etc. In the first industrial revolution characterized by print and ideological consciousness, empathic sensibility extended to national borders, with Americans empathizing with Americans, Germans with Germans, Japanese with Japanese and so on. In the second industrial revolution, characterized by electronic communication and psychological consciousness, individuals began to identify with like-minded others. Today, we are on the cusp of another historic convergence of energy and communication--a third industrial revolution--that could extend empathic sensibility to the biosphere itself and all of life on Earth. The distributed Internet revolution is coming together with distributed renewable energies, making possible a sustainable, post-carbon economy that is both globally connected and locally managed. In the 21st century, hundreds of millions--and eventually billions--of human beings will transform their buildings into power plants to harvest renewable energies on site, store those energies in the form of hydrogen and share electricity, peer-to-peer, across local, regional, national and continental inter-grids that act much like the Internet. The open source sharing of energy, like open source sharing of information, will give rise to collaborative energy spaces--not unlike the collaborative social spaces that currently exist on the Internet. When every family and business comes to take responsibility for its own small swath of the biosphere by harnessing renewable energy and sharing it with millions of others on smart power grids that stretch across continents, we become intimately interconnected at the most basic level of earthly existence by jointly stewarding the energy that bathes the planet and sustains all of life. The new distributed communication revolution not only organizes distributed renewable energies, but also changes human consciousness. The information communication technologies (ICT) revolution is quickly extending the central nervous system of billions of human beings and connecting the human race across time and space, allowing empathy to flourish on a global scale, for the first time in history. Whether in fact we will begin to empathize as a species will depend on how we use the new distributed communication medium. While distributed communications technologies-and, soon, distributed renewable energies - are connecting the human race, what is so shocking is that no one has offered much of a reason as to why we ought to be connected. We talk breathlessly about access and inclusion in a global communications network but speak little of exactly why we want to communicate with one another on such a planetary scale. What's sorely missing is an overarching reason that billions of human beings should be increasingly connected. Toward what end? The only feeble explanations thus far offered are to share information, be entertained, advance commercial exchange and speed the globalization of the economy. All the above, while relevant, nonetheless seem insufficient to justify why nearly seven billion human beings should be connected and mutually embedded in a globalized society. The idea of even billion individual connections, absent any overall unifying purpose, seems a colossal waste of human energy. More important, making global connections without any real transcendent purpose risks a narrowing rather than an expanding of human consciousness. But what if our distributed global communication networks were put to the task of helping us re-participate in deep communion with the common biosphere that sustains all of our lives? The biosphere is the narrow band that extends some forty miles from the ocean floor to outer space where living creatures and the Earth's geochemical processes interact to sustain each other. We are learning that the biosphere functions like an indivisible organism. It is the continuous symbiotic relationships between every living creature and between living creatures and the geochemical processes that ensure the survival of the planetary organism and the individual species that live within its biospheric envelope. If every human life, the species as a whole, and all other life-forms are entwined with one another and with the geochemistry of the planet in a rich and complex choreography that sustains life itself, then we are all dependent on and responsible for the health of the whole organism. Carrying out that responsibility means living out our individual lives in our neighborhoods and communities in ways that promote the general well-being of the larger biosphere within which we dwell. The Third Industrial Revolution offers just such an opportunity. If we can harness our empathic sensibility to establish a new global ethic that recognizes and acts to harmonize the many relationships that make up the life-sustaining forces of the planet, we will have moved beyond the detached, self-interested and utilitarian philosophical assumptions that accompanied national markets and nation state governance and into a new era of biosphere consciousness. We leave the old world of geopolitics behind and enter into a new world of biosphere politics, with new forms of governance emerging to accompany our new biosphere awareness. The Third Industrial Revolution and the new era of distributed capitalism allow us to sculpt a new approach to globalization, this time emphasizing continentalization from the bottom up. Because renewable energies are more or less equally distributed around the world, every region is potentially amply endowed with the power it needs to be relatively self-sufficient and sustainable in its lifestyle, while at the same time interconnected via smart grids to other regions across countries and continents.

### Yes Transition

#### Prolong growth for as long as possible – allows incremental reforms – fast collapse means we don’t have the resources to transition to a sustainable economy

Carl Etnier, staff writer, 2007, “Peak Oil Check-In: The inevitability of financial collapse,” Audio Port, http://www.audioport.org/index.php?op=script&program\_id=21526&version\_id=22423&nav=&session=Jen

Unlike human death, economic collapse is not inevitable. However, the US economy has long been on a trajectory towards such massive change that “collapse” is not too strong a word. Our country has squandered its post-World War II prosperity, much of it on investments unsuited to the 21st century. The US overextended itself, building a system of interstate highways and smaller roads and bridges that neither the states nor the federal government can seem to find the money to maintain. When we’re lucky, locally vital bridges like the Route 2 bridge in Middlesex or the bridge in downtown Richmond are closed before they collapse. When we’re unlucky, as they were in Minneapolis last year, an 8-lane bridge collapses while filled with rush-hour traffic. James Howard Kunstler, author of “The Long Emergency,” has called post-war sprawl “perhaps the greatest misallocation of resources the world has ever known.” Suburbs, and the isolated country homes that we have so many of in Vermont, require large infusions of oil. Oil moves people back and forth to work, play, shopping, and worship. Oil brings in food and goods and carries away garbage. As world oil production reaches a peak and then declines, Kunstler expects sprawl to leave a legacy of ghost suburbs and radically altered living arrangements. Those suburbs that are not abandoned will be sparsely occupied, with lawns turned into mini-farms. Proud family McMansions will be subdivided into apartments by owners who can’t afford to live in them alone. People will be concentrated along rail or bus lines, and those left living in the countryside will be isolated, their trips to town infrequent at best. The collapse of the housing bubble and high energy prices are already starting to realize Kunstler’s expectation. Subdivisions are being abandoned, half-built. And home values are dropping faster in outlying areas, than in or near city centers. Kunstler’s background is in theater, journalism, and writing novels and non-fiction books. Numerous people with much different, more technocratic backgrounds have come to similar conclusions about the underlying economic trends. They come from top government contractors, Vice-President Dick Cheney’s secretive energy task force, and even Congress itself. What’s the best way to spend our monies as the industrial economy and whole patterns of living are dramatically re-arranged? Not on bailing out automakers, as Congress just allocated $25 billion towards. We need strong investment in efficiency, converting to renewable energy, strengthening local agriculture, better rail and other public transit, and anything that builds stronger communities and protects the most vulnerable. Personal investment in preparedness is important, too. Warren Buffet thinks this is the time to invest $5 billion in Goldman Sachs. Me? I finally ordered that cider press I’d been eying. I’m thinking of joining the co-op formed by some East Montpelier neighbors for a small-scale dry bean thresher and winnower. And I’m learning local wild edibles at Wisdom of the Herbs School and using permaculture design principles to turn our yard into a woodland garden. So what do I want the primary cause of US financial collapse to be? Well, I can better answer the question of how I prefer to see the collapse happen. I’d like to see it happen slowly, with enough small scares to wake people up to the scale of the problem while we still have significant resources to invest in a transition to a post-oil economy.

### Growth Inevitable – Human Nature

#### Growth is hardwired – attempts to move away from it cause backlash

Brad Allenby, Professor of Civil and Environmental Engineering, and of Law, at Arizona State University, having moved from his previous position as the Environment, 3-7-2007, “The Benefits of Our Hardwired Need to Consume,” Greenbiz, http://www.greenbiz.com/blog/2007/03/07/benefits-our-hardwired-need-consume

Take the recent work by George Lowenstein at Carnegie-Mellon University, Brian Knutson of Stanford, and Drazen Prelec of MIT. In order to better understand the brain chemistry underlying consumption, they presented product choices, then payment choices, to volunteers while scanning their brains with functional magnetic resonance imaging. They found that the nucleus accumbens, which is involved in processing reward stimuli (food, recreational drugs) was activated by presentation of desirable products such as chocolates, while the insular cortex, linked to expectations of pain, was activated by price information. After both product and price were presented, the prefrontal cortex, an area associated with rational calculation, engaged as well. This not only indicated that modern behavior ("rational" consumption choices) are piggybacking on neural circuits evolved for much different circumstances (not a surprise), but leads to some interesting if speculative possibilities. A fairly straightforward interpretation of these data is the suggestion that, at the neural level, consumption is affected, perhaps significantly, by a weighing of immediate pleasure versus immediate pain, rather than rational calculation, which only comes later. This may not sound revolutionary, especially to marketing gurus, but it nonetheless has some substantial implications. To begin with, it emphasizes the importance of marketing and presentation in consumption: if the benefits of a product can be made explicit and attractive from the beginning, the decision to purchase can be encouraged before the "rational weighing" process is even engaged. This might argue against the traditional environmental project of reducing consumption by generating large amounts of environmental information to be appended to particular products: if the V8 GT or large SUV is initially appealing, information on fuel consumption may be only marginally relevant because it enters the cognitive processes after the purchasing decision is essentially made. Conceptually, in other words, the environmental approach to reducing consumption through product specific information implicitly accepts "the rational consumer" model of human behavior: provide more information on social and environmental costs, and consumers, rationally balancing their options, will choose the more “rational” outcome -- that is, environmental preferability (remembering that consumers may not share the values prioritization of environmentalists). This appears to be an oversimplistic, if not incorrect, model of consumer cognition. However, while this research might discourage product-by-product information schemes, it might support general anti-consumption campaigns. After all, such campaigns when successful make the act of consumption itself more negative emotionally, and thus enhance the expectations of pain associated with any consumption (the downsides of consistently negative messages from environmentalists are well known, however, and might generate consumer backlash that outweighs such consumption reduction effects over time). Another, perhaps more difficult, implication is the possibility that use of credit, which on balance reduces the immediate “pain” of a purchase because nothing material is apparently given up in exchange, creates a context within which consumers are inherently weighted towards consumption (the researchers have not yet tested this hypothesis). The growth and differentiation of credit mechanisms, and the dematerialization of money, are long-term trends in developed economies, and a major mechanism supporting the continued growth in complexity of financial and economic structures. Thus, it becomes problematic for anti-consumption activists if the inherent dynamics and structure of economic systems as they evolve shifts the balance between consumption and pain towards consumption. That consumption has deep emotional dimensions, and that access to credit encourages economic growth, and along with it consumption, are not revolutionary findings. But that consumption decisions engage particular brain pathways in ways that affect the effectiveness of environmental campaigns and projects is both interesting and important, even if at this point it may be difficult to be sure quite how these new discoveries cut. At the least, however, the demonstration that even apparently straightforward decisions are, in fact, grounded in pre-rational cognitive information processing suggests that environmental and sustainability activists need to become more sophisticated in the way they think about, and seek to socially engineer, consumption decisions. For social engineering is a double-edged sword, and especially in areas like consumption, increasingly understood as involving complex and fundamental behaviors, such efforts can rebound against those who seek to impose such behavior change, regardless of their good intentions.

### Growth Inevitable – Human Nature

#### The desire for freedom and growth is innate – moving away risks totalitarianism, violence, poverty and war

Paul Aligica, Fellow at the Mercatus Center at George Mason University and Adjunct Fellow at the Hudson Institute, “The Great Transition and the Social Limits to Growth: Herman Kahn on Social Change and Global Economic Development”, 4-21-2003, http://www.hudson.org/index.cfm?fuseaction=publication\_details&id=2827

Stopping things would mean if not to engage in an experiment to change the human nature, at least in an equally difficult experiment in altering powerful cultural forces: "We firmly believe that despite the arguments put forward by people who would like to 'stop the earth and get off,' it is simply impractical to do so. Propensity to change may not be inherent in human nature, but it is firmly embedded in most contemporary cultures. People have almost everywhere become curious, future oriented, and dissatisfied with their conditions. They want more material goods and covet higher status and greater control of nature. Despite much propaganda to the contrary, they believe in progress and future" (Kahn, 1976, 164). As regarding the critics of growth that stressed the issue of the gap between rich and poor countries and the issue of redistribution, Kahn noted that what most people everywhere want was visible, rapid improvement in their economic status and living standards, and not a closing of the gap (Kahn, 1976, 165). The people from poor countries have as a basic goal the transition from poor to middle class. The other implications of social change are secondary for them. Thus a crucial factor to be taken into account is that while the zero-growth advocates and their followers may be satisfied to stop at the present point, most others are not. Any serious attempt to frustrate these expectations or desires of that majority is likely to fail and/or create disastrous counter reactions. Kahn was convinced that "any concerted attempt to stop or even slow 'progress' appreciably (that is, to be satisfied with the moment) is catastrophe-prone". At the minimum, "it would probably require the creation of extraordinarily repressive governments or movements-and probably a repressive international system" (Kahn, 1976, 165; 1979, 140-153). The pressures of overpopulation, national security challenges and poverty as well as the revolution of rising expectations could be solved only in a continuing growth environment. Kahn rejected the idea that continuous growth would generate political repression and absolute poverty. On the contrary, it is the limits-to-growth position "which creates low morale, destroys assurance, undermines the legitimacy of governments everywhere, erodes personal and group commitment to constructive activities and encourages obstructiveness to reasonable policies and hopes". Hence this position "increases enormously the costs of creating the resources needed for expansion, makes more likely misleading debate and misformulation of the issues, and make less likely constructive and creative lives". Ultimately "it is precisely this position the one that increases the potential for the kinds of disasters which most at its advocates are trying to avoid" (Kahn, 1976, 210; 1984).

### AT: Collapse Inevitable

#### Growth sustainable – tech causes decoupling

Brent Barker, electrical engineer, and manager of corporate communications for the Electric Power Research Institute and former industrial economist and staff author at SRI International and as commercial research analyst at USX Corporation, Summer 2000, “Technology and the Quest for Sustainability.” EPRI Journal, infotrac.

In the twenty-first century, industrial processes will be revolutionized by new electrotechnologies, including lasers, plasmas, microwaves, and electron beams for materials processing, as well as electrochemical synthesis and electroseparation for chemical processing. Manufacturing will be revolutionized by a host of emerging technology platforms--for example, nanotechnology, biotechnology, biomimetics, high-temperature superconductivity, and network technology including the combining of advanced sensors with information technology to create adaptive, intelligent systems and processes. Future industrial facilities using advanced network technologies will be operated in new ways to simultaneously optimize productivity energy use, materials consumption, and plant emissions. Optimization will extend beyond the immediate facility to webs of facilities supporting industrial and urban ecology with the waste of one stream becoming the feedstock of the next. In the aggregate, the penetration of all the emerging technologies into the global economy should make it possible to sustain industrial productivity growth rates above 2% per year for many decades. The same technology platforms will be used to improve the efficiency of land, energy and water use, For example, distributed sensors and controls that enable precision farming can improve crop yields and reduce land and water use. And doubling or even tripling global energy efficiency in the next century is well within our means. Given the inefficiencies that now exist at every stage in the process--from mining and drilling for fuel through the use of energy in automobiles, appliances, and processes--the overall efficiency of the energy chain is only about 5%. From a social standpoint, accelerating productivity is not an option but rather an imperative for the future. It is necessary in order to provide the wealth for environmental sustainability, to support an aging population in the industrialized world, and to provide an economic ladder for developing nations. The second area of opportunity for technology lies in its potential to help stabilize global population at 10-12 billion sometime in the twenty-first century, possibly as early as 2075. The key is economics. Global communications, from television to movies to the Internet, have brought an image of the comfortable life of the developed world into the homes of the poorest people, firing their own aspirations for a better quality of life, either through economic development in their own country or through emigration to other countries. If we in the developed world can make the basic tools of prosperity--infrastructure, health care, education, and law--more accessible and affordable, recent history suggests that the cultural drivers for producing large families will be tempered, relatively quickly and without coercion. But the task is enormous. The physical prerequisites for prosperity in the global economy are electricity and communications. Today, there are more than 2 billion people living without electricity, or commercial energy in any form, in the very countries where some 5 billion people will be added in the next 50 years. If for no other reason than our enlightened self-interest, we should strive for universal access to electricity, communications, and educational opportunity. We have little choice, because the fate of the developed world is inextricably bound up in the economic and demographic fate of the developing world. A third, related opportunity for technology is in decoupling population growth from land use and, more broadly, decoupling economic growth from natural resource consumption through recycling, end-use efficiency, and industrial ecology. Decoupling population from land use is well under way. According to Grubler, from 1700 to 1850 nearly 2 hectares of land (5 acres) were needed to support every child born in North America, while in the more crowded and cultivated regions of Europe and Asia only 0.5 hectare (1.2 acres) and 0.2 hectare (0.5 acre) were needed, respectively. During the past century, the amount of land needed per additional child has been dropping in all areas of the world, with Europe and North America experiencing the fastest decreases. Both crossed the "zero threshold" in the past few decades, meaning that no additional land is needed to support additional children and that land requirements will continue to decrease in the future. One can postulate that the pattern of returning land to nature will continue to spread throughout the world, eventually stemming and then reversing the current onslaught on the great rain forests. Time is critical if vast tracts are to be saved from being laid bare, and success will largely depend on how rapidly economic opportunities expand for those now trapped in subsistence and frontier farming. In concept, the potential for returning land to nature is enormous. Futurist and scholar Jesse Ausubel of the Rockefeller University calculates that if farmers could lift average grain yields around the world just to the level of today's average U.S. corn grower, one-half of current global cropland--an area the size of the Amazon basin--could be spared. If agriculture is a leading indicator, then the continuous drive to produce more from less will prevail in other parts of the economy Certainly with shrinking agricultural land requirements, water distribution and use around the world can be greatly altered, since nearly two-thirds of water now goes for irrigation. Overall, the technologies of the future will, in the words of Ausubel, be "cleaner, leaner, lighter, and drier"--that is, more efficient and less wasteful of materials and water. They will be much more tightly integrated through microprocessor-based control and will therefore use human and natural resources much more efficiently and productively. Energy intensity, land intensity, and water intensity (and, to a lesser extent, materials intensity) for both manufacturing and agriculture are already heading downward. Only in agriculture are they falling fast enough to offset the surge in population, but, optimistically, advances in science and technology should accelerate the downward trends in other sectors, helping to decouple economic development from environmental impact in the coming century. One positive sign is the fact that recycling rates in North America are now approaching 65% for steel, lead, and copper and 30% for aluminum and paper. A second sign is that economic output is shifting away from resource-intensive products toward knowledge-based, immaterial goods and services. As a result, although the U.S. gross domestic product (GDP) increased 200-fold (in real dollars) in the twentieth century, the physical weight of our annual output remains the same as it was in 1900. If anything, this trend will be accelerating. As Kevin Kelly, the editor of Wired magazine, noted, "The creations most in demand from the United States [as exports] have lost 50% of their physical weight per dollar of value in only six years.... Within a generation, two at most, the number of people working in honest-to-goodness manufacturing jobs will be no more than the number of farmers on the land--less than a few percent. Far more than we realize, the network economy is pulling us all in." Even pollution shows clear signs of being decoupled from population and economic growth. Economist Paul Portney notes that, with the exception of greenhouse gases, "in the OECD [Organization for Economic Cooperation and Development] countries, the favorable experience [with pollution control] has been a triumph of technology That is, the ratio of pollution per unit of GDP has fallen fast enough in the developed world to offset the increase in both GDP per capita and the growing number of 'capitas' themselves." The fourth opportunity for science and technology stems from their enormous potential to unlock resources not now available, to reduce human limitations, to create new options for policymakers and businesspeople alike, and to give us new levels of insight into future challenges. Technically resources have little value if we cannot unlock them for practical use. With technology, we are able to bring dormant resources to life. For example, it was only with the development of an electrolytic process late in the nineteenth century that aluminum--the most abundant metal on earth--became commercially available and useful. Chemistry unlocked hydrocarbons. And engineering allowed us to extract and put to diverse use untapped petroleum and gas fields. Over the course of history, technology has made the inaccessible accessible, and resource depletion has been more of a catalyst for change than a longstanding problem. Technology provides us with last-ditch methods (what economists would call substitutions) that allow us to circumvent or leapfrog over crises of our own making. Agricultural technology solved the food crisis of the first half of the nineteenth century. The English "steam crisis" of the 1860s, triggered by the rapid rise of coal-burning steam engines and locomotives, was averted by mechanized mining and the discovery and use of petroleum. The U.S. "timber crisis" that Teddy Roosevelt publicly worried about was circumvented by the use of chemicals that enabled a billion or so railroad ties to last for decades instead of years. The great "manure crisis" of the same era was solved by the automobile, which in a few decades replaced some 25 million horses and freed up 40 million hectares (100 million acres) of farmland, not to mention improving the sanitation and smell of inner cities. Oil discoveries in Texas and then in the Middle East pushed the pending oil crisis of the 1920s into the future. And the energy crisis of the 1970s stimulated the development of new sensing and drilling technology, sparked the advance of non--fossil fuel alternatives, and deepened the penetration of electricity with its fuel flexibility into the global economy. Thanks to underground imaging technology, today's known gas resources are an order of magnitude greater than the resources known 20 years ago, and new reserves continue to be discovered. Technology has also greatly extended human limits. It has given each of us a productive capability greater than that of 150 workers in 1800, for example, and has conveniently put the power of hundreds of horses in our garages. In recent decades, it has extended our voice and our reach, allowing us to easily send our words, ideas, images, and money around the world at the speed of light. But global sustainability is not inevitable. In spite of the tremendous promise that technology holds for a sustainable future, there is the potential for all of this to backfire before the job can be done. There are disturbing indications that people sometimes turn in fear and anger on technologies, industries, and institutions that openly foster an ever-faster pace of change. The current opposition to nuclear power genetically altered food, the globalization of the economy and the spread of American culture should give us pause. Technology has always presented a two-edged sword, serving as both cause and effect, solving one problem while creating another that was unintended and often unforeseen. We solved the manure crisis, but automotive smog, congestion, and urban sprawl took its place. We cleaned and transformed the cities with all-electric buildings rising thousands of feet into the sky. But while urban pollution was thereby dramatically reduced, a portion of the pollution was shifted to someone else's sky. "Limits to growth" was a popular theme in the 1970s, and a best-selling book of that name predicted dire consequences for the human race by the end of the century. In fact, we have done much better than those predictions, largely because of a factor the book missed--the potential of new technology to break limits. Repeatedly, human societies have approached seemingly insurmountable barriers only to find the means and tools to break through. This ability has now become a source of optimism, an article of faith, in many parts of the world. Today's perceived limits, however, look and feel different. They are global in nature, multicultural, and larger in scale and complexity than ever before. Nearly 2 billion people in the world are without adequate sanitation, and nearly as many are without access to clean drinking water. AIDS is spreading rapidly in the regions of the world least able to fight it. Atmospheric concentrations of greenhouse gases are more than 30% greater than preindustrial levels and are climbing steadily. Petroleum reserves, expected to be tapped by over a billion automobiles worldwide by 2015, may last only another 50-100 years. And without careful preservation efforts, the biodiversity of the planet could become as threatened in this coming century as it was at the end of the last ice age, when more than 70% of the species of large mammals and other vertebrates in North America disappeared (along with 29% in Europe and 86% in Australia). All these perceived limits require innovation of a scope and intensity surpassing humankind's current commitment. The list of real-world problems that could thwart global sustainability is long and sobering. It includes war, disease, famine, political and religious turmoil, despotism, entrenched poverty, illiteracy, resource depletion, and environmental degradation. Technology can help resolve some of these issues--poverty and disease, resource depletion, and environmental impact, for example--but it offers little recourse for the passions and politics that divide the world. The likelihood is that we will not catch up and overtake the moving target of global sustainability in the coming century, but given the prospects for technology, which have never been brighter, we may come surprisingly close. We should put our technology to work, striving to lift more than 5 billion people out of poverty while preventing irreversible damage to the biosphere and irreversible loss of the earth's natural resources. We cannot see the future of technology any more clearly than our forebears did--and for much the same reason. We are approaching the threshold of profound change, moving at great speed across a wide spectrum of technology, ranging today from the Internet to the Human Genome project. Technology in the twenty-first century will be turning toward biological and ecological analogs, toward microminiature machines, toward the construction of materials atom by atom, and toward the dispersion of microprocessor intelligence into everyday objects subsequently linked into neural networks. Computing power continues to double every 18 months, as postulated in Moore's law, promising to enable us to create much more powerful tools for everyday tasks, optimize business services and processes along new lines, understand complex natural phenomena like the weather and climate, and design technical systems that are self-diagnostic, self-healing, and self-learning. The networked, digital society of the future should be capable of exponential progress more in tune with biological models of growth than with the incremental progress of industrial societies. If history tells us anything, it is that in the long term we are much more likely to underestimate technology than to overestimate it. We are not unlike the excited crowds that in 1909 tried to imagine the future of flight as they watched Wilbur Wright loop his biplane twice around the Statue of Liberty and head back to Manhattan at the record-breaking speed of 30 miles per hour. As wild as one's imagination and enthusiasm might have been, it would have been inconceivable that exactly 60 years later humans would fly to the moon and back.

### AT: Collapse Inevitable – Peak Oil

#### No peak oil – new discoveries and supply expansion from lagged price response

George Monbiot, staff writer, 7-2-2012, “False Summit,” http://www.monbiot.com/2012/07/02/false-summit/

The facts have changed, now we must change too. For the past ten years an unlikely coalition of geologists, oil drillers, bankers, military strategists and environmentalists has been warning that peak oil – the decline of global supplies – is just around the corner. We had some strong reasons for doing so: production had slowed, the price had risen sharply, depletion was widespread and appeared to be escalating. The first of the great resource crunches seemed about to strike. Among environmentalists it was never clear, even to ourselves, whether or not we wanted it to happen. It had the potential both to shock the world into economic transformation, averting future catastrophes, and to generate catastrophes of its own, including a shift into even more damaging technologies, such as biofuels and petrol made from coal. Even so, peak oil was a powerful lever. Governments, businesses and voters who seemed impervious to the moral case for cutting the use of fossil fuels might, we hoped, respond to the economic case. Some of us made vague predictions, others were more specific. In all cases we were wrong. In 1975 MK Hubbert, a geoscientist working for Shell who had correctly predicted the decline in US oil production, suggested that global supplies could peak in 1995(1). In 1997 the petroleum geologist Colin Campbell estimated that it would happen before 2010(2). In 2003 the geophysicist Kenneth Deffeyes said he was “99 per cent confident” that peak oil would occur in 2004(3). In 2004, the Texas tycoon T. Boone Pickens predicted that “never again will we pump more than 82 million barrels” per day of liquid fuels(4). (Average daily supply in May 2012 was 91 million(5)). In 2005, the investment banker Matthew Simmons maintained that “Saudi Arabia … cannot materially grow its oil production.”(6) (Since then its output has risen from 9 million barrels a day to 10, and it has another 1.5 million in spare capacity(7,8)). Peak oil hasn’t happened, and it’s unlikely to happen for a very long time. A report by the oil executive Leonardo Maugeri, published by Harvard University, provides compelling evidence that a new oil boom has begun(9). The constraints on oil supply over the past ten years appear to have had more to do with money than geology. The low prices before 2003 had discouraged investors from developing difficult fields. The high prices of the past few years have changed that. Maugeri’s analysis of projects in 23 countries suggests that global oil supplies are likely to rise by a net 17m barrels per day (to 110m) by 2020. This, he says, is “the largest potential addition to the world’s oil supply capacity since the 1980s.” The investments required to make this boom happen depend on a long-term price of $70 a barrel. The current cost of Brent crude is $95(10). Money is now flooding into new oil: a trillion dollars was spent over the past two years, a record $600bn is lined up for 2012(11). The country in which production is likely to rise furthest is Iraq, into which multinational companies are now sinking their money, and their claws. The bigger surprise is that the other great boom is likely to happen in the US. Hubbert’s Peak, the famous bell-shaped graph depicting the rise and fall of US oil, is set to become Hubbert’s Rollercoaster. Investment there will concentrate on unconventional oil, especially shale oil (which, confusingly, is not the same as oil shale). Shale oil is high-quality crude trapped in rocks through which it doesn’t flow naturally. There are, we now know, monstrous deposits in the United States: one estimate suggests that the Bakken shales in North Dakota contain almost as much oil as Saudi Arabia (though less of it is extractable)(12). And this is one of 20 such formations in the US. Extracting shale oil requires horizontal drilling and fracking: a combination of high prices and technological refinements has made them economically viable. Already production in North Dakota has risen from 100,000 barrels a day in 2005 to 550,000 this January (13).

### AT: Collapse Inevitable – Resources

#### No limits – substitution and pricing prevents scarcity

Beth Haynes, Professor of Economics at Brigham Young University-Hawaii, 8-19-2008, “Finite Resources vs. Infinite Resourcefulness”, http://wealthisnottheproblem.blogspot.com/2008/08/finite-resources-vs-infinite.html)

A significant number of environmental concerns center on this fear of using up some important resource: oil, rainforest, fresh water, open space, biodiversity. The concern is genuine. The fears are real. People then work to pass laws which intentionally slow production and hinder (even prevent) consumption. The express purpose is to make us poorer in the short run with the hope of preventing poverty in the long run. It’s common sense. Save today in order to have some available tomorrow. It’s how our bank accounts work, so it seems logical to apply the same reasoning to resource use. But there is a catch. All of economic history, up to and including today, demonstrates that the more we exploit our natural resources, the more available they become. (3-7) How can this possibly be? If we use our “limited, non-renewable resources” we have to end up with less, right? Actually, no. And here is why. We don’t simply “use up” existing resources; we constantly create them. We continually invent new processes, discover new sources, improve the efficiency of both use and extraction, while at the same time we discover cheaper, better alternatives. The fact that a particular physical substance is finite is irrelevant. What is relevant is the process of finding ways to meet human needs and desires. The solutions, and thus what we consider resources, are constantly changing. Oil was a nuisance, not a resource, until humans discovered a use for it. In order to survive and flourish, human beings must succeed at fulfilling certain needs and desires. This can be accomplished in a multitude of ways using a multitude of materials. The requirements of life set the goals. How these goals are met does not depend on the existence or the availability of any particular material. Limits are placed not by the finiteness of a physical substance, but by the extent of our knowledge, of our wealth, and of our freedom. Knowledge. Wealth. Freedom. These are the factors which are essential to solving the problems we face. “The Stone Age didn’t end because we ran out of stones.” (8) Think for a minute about how we have solved the problem of meeting basic needs throughout history: Transportation: from walking to landing on the moon Communication: from face-to-face conversations to the World Wide Web. Food: from hunting and gathering to intravenous feeding and hydroponics. Shelter: from finding a cave to building skyscrapers Health care: from shamans to MRIs and neurosurgery. How does progress happen? A synopsis of the process is provided by the main theme of Julian Simon’s book, The Ultimate Resource 2: More people, and increased income, cause resources to become more scarce in the short run. Heightened scarcity causes prices to rise. The higher prices present opportunity and prompt inventors and entrepreneurs to search for solutions. Many fail in the search, at cost to themselves. But in a free society, solutions are eventually found. And in the long run, the new developments leave us better off than if the problems had not arisen, that is, prices eventually become lower than before the scarcity occurred. (9) This idea is not just theory. Economists and statisticians have long been analyzing the massive amounts of data collected on resource availability. The conclusion: our ability to solve the problems of human existence is ever-expanding. Resources have become less scarce and the world is a better place to live for more and more people. (3-7) Overall, we create more than we destroy as evidenced by the steady progress in human well being and there is no evidence for concluding that this trend can't and won't continue. Doomsday predictions have been with us since ancient times and they have consistently been proven wrong. The science of economics has a crucial perspective to offer in the debates on resource scarcity and environmental policy. As economics professor Steven Horowitz explains, “The problem of scarcity –and how to handle it- are at the center of the discipline.” (10) The claim that resources are not finite goes against our common sense, but, that’s when science has the most to offer: when the facts, and their cause and effect connections, are counter-intuitive. What seems obvious may in fact be wrong. Science is what allows us to discriminate. Economist Julian Simon refutes the environmentalist focus on "finite resources" with an extensive presentation of empirical evidence as well as a theoretical explanation for the long-term decrease in resource scarcity. He also offers several possibilities as to how we could continue to increase our supply of minerals, energy and food, while simultaneously improving the quality of our air and water. (3) Economist Dr. George Reisman offers both an economic and philosophic analysis of functionally unlimited resource availability in “Natural Resources and the Environment,” the third chapter of his treatise on economics. (11) Indur Goklany provides updates to the evidence that economic growth and environmental improvement go hand-in-hand. Resource development, economic progress and environmental improvement do not take place in a political vacuum. The connections between freedom, wealth and human-well being are documented and analyzed in at least two projects, the Economic Freedom of the World and the Index of Economic Freedom. Economic liberty, in particular the right to property, is an essential ingredient for releasing the potential of technology and innovation to solve the challenges we face. Here too, economists have much to add to our understanding on the mechanisms of resource (and wealth) creation. It is their stock and trade. The finiteness of any specific physical resource is made irrelevant by the presence of the ultimate resource: human ingenuity unleashed in a free society.

#### Constant innovation ensures resources are infinite

Marc Geddes, Writer and Libertarian Analyst, 2-12-2004, “The monster non-socialist FAQ”, http://rebirthofreason.com/War/MonsterFAQ.shtml

A significant disruption to supplies of critical resources can cause temporary problems, but in a free market, if resources start to become scarce, prices rise, leading to a search of substitutes and improved conservation efforts. The pool of resources is not fixed, because human ingenuity can find substitutes or new sources of resources. Supplies of most raw materials have been increasing throughout the 20th century, and the cost has been falling (See the entry on Natural resources). For instance, between 1950 and 1970, bauxite (aluminium source) reserves increased by 279 per cent, copper by 179 per cent, chromite (chromium source) by 675 per cent, and tin reserves by 10 per cent. In 1973 experts predicted oil reserves stood at around 700 billion barrels, yet by 1988 total oil reserves had actually increased to 900 billion barrels. Production of certain kinds of resources such as fossil fuels may finally be beginning to peak but there are renewable energy sources in development which can serve as substitutes. Simplistic thermodynamic analysis of energy production is misleading, because it's not the quantities of energy used or produced that determine economic value, but the utility, or usefulness if that energy to humans. If energy is being used more efficiently you don't need as much of it, and some forms of energy are more valuable than others- for instance kinetic energy in the form of wind power is less valuable than the same quantity of latent energy in the form of oil. Solar power is a virtually inexhaustible supply of new energy for stationary sources and the hydrogen fuel cell can serve for transportation in place of fossil fuels. Developing these technologies costs money, so to avoid resource shortages a good economy is essential. Libertarian capitalism is the system which generates wealth the fastest.

### AT: Collapse Inevitable – K-Waves

#### K-waves are totally made up

Gary North, Austrian School economic analyst, PhD in History, 6-27-2009, “The Myth of the Kondratieff Wave,” http://www.lewrockwell.com/north/north725.html

Kondratieff had at most two and a half cycles in his two papers. That number was available for only four data series. Of the 36 data series, he could find evidence of cycles in only 11 of them. The monetary series and the real series correlated in only 11 of 21 series, all short. Pugsley then cited extensively from an article by C. Van Ewijk of the University of Amsterdam (The Economist, Nov. 3, 1981). Van Ewijk noted that Kondratieff followed no consistent methodology in choosing the types of trend curves that he selected for different data sources. Kondratieff used various statistical techniques to smooth the curves to make them appear as long waves. "In case after case, no wave could be identified." He used price data, but these did not correlate with the actual economic output of the four economies that he studied. Then the waves that he presented were further "idealized" by whoever created the chart that has circulated ever since. Pugsley noted: "The upward movement of prices from 1933 to the present has already spanned fifty years, which is supposed to be the average length of a complete cycle." So far, price inflation has extended for about 75 years. Yet the deflationists are still predicting long-term, severe price deflation, and some of them invoke the Kondratieff wave to prove their assertion. Pugsley concluded: In not one case does the evidence corroborate the existence of the wave. Prices and output are not directly related — if anything they are inversely related. The forty-five to sixty-year period of the wave is only partially evident in the nineteenth century, and then only in the price series. Price moves in the twentieth century do not correspond to this periodicity, as claimed by long-wave proponents. There is absolutely no statistical correlation between series of real variables such as production and consumption, and monetary series such as prices and interest rates. Production and prices of the four countries studied do not statistically correlate; thus there is no wave operating coincidentally in the industrialized countries. In other words, Kondratieff's hypothesis is simply not supported by any evidence. The long wave exists only in the minds of a few misguided analysts, but not in the real world. It is pure hokum.

### Collapse Bad – Regrowth

#### Collapse isn’t sustainable – growth is a hydra

Walter Russell Mead, Senior Fellow in U.S. Foreign Policy at the Council on Foreign Relations, 2-4-2009, The New Republic, “Only Makes You Stronger”, 2/4, http://www.tnr.com/politics/story.html?id=571cbbb9-2887-4d81-8542-92e83915f5f8&p=2

And yet, this relentless series of crises has not disrupted the rise of a global capitalist system, centered first on the power of the United Kingdom and then, since World War II, on the power of the United States. After more than 300 years, it seems reasonable to conclude that financial and economic crises do not, by themselves, threaten either the international capitalist system or the special role within it of leading capitalist powers like the United Kingdom and the United States. If anything, the opposite seems true--that financial crises in some way sustain Anglophone power and capitalist development. Indeed, many critics of both capitalism and the "Anglo-Saxons" who practice it so aggressively have pointed to what seems to be a perverse relationship between such crises and the consolidation of the "core" capitalist economies against the impoverished periphery. Marx noted that financial crises remorselessly crushed weaker companies, allowing the most successful and ruthless capitalists to cement their domination of the system. For dependency theorists like Raul Prebisch, crises served a similar function in the international system, helping stronger countries marginalize and impoverish developing ones.

### Collapse Bad – Transition Wars

#### Collapse is worse for all their impacts-causes extinction of every other species and then humans

George Monbiot, staff writer, 8-17-2009, “Is there any point in fighting to stave off industrial apocalypse?” Guardian, http://www.guardian.co.uk/commentisfree/cif-green/2009/aug/17/environment-climate-change

The interesting question, and the one that probably divides us, is this: to what extent should we welcome the likely collapse of industrial civilisation? Or more precisely: to what extent do we believe that some good may come of it? I detect in your writings, and in the conversations we have had, an attraction towards – almost a yearning for – this apocalypse, a sense that you see it as a cleansing fire that will rid the world of a diseased society. If this is your view, I do not share it. I'm sure we can agree that the immediate consequences of collapse would be hideous: the breakdown of the systems that keep most of us alive; mass starvation; war. These alone surely give us sufficient reason to fight on, however faint our chances appear. But even if we were somehow able to put this out of our minds, I believe that what is likely to come out on the other side will be worse than our current settlement. Here are three observations: 1 Our species (unlike most of its members) is tough and resilient; 2 When civilisations collapse, psychopaths take over; 3 We seldom learn from others' mistakes. From the first observation, this follows: even if you are hardened to the fate of humans, you can surely see that our species will not become extinct without causing the extinction of almost all others. However hard we fall, we will recover sufficiently to land another hammer blow on the biosphere. We will continue to do so until there is so little left that even Homo sapiens can no longer survive. This is the ecological destiny of a species possessed of outstanding intelligence, opposable thumbs and an ability to interpret and exploit almost every possible resource – in the absence of political restraint. From the second and third observations, this follows: instead of gathering as free collectives of happy householders, survivors of this collapse will be subject to the will of people seeking to monopolise remaining resources. This will is likely to be imposed through violence. Political accountability will be a distant memory. The chances of conserving any resource in these circumstances are approximately zero. The human and ecological consequences of the first global collapse are likely to persist for many generations, perhaps for our species' remaining time on earth. To imagine that good could come of the involuntary failure of industrial civilisation is also to succumb to denial. The answer to your question – what will we learn from this collapse? – is nothing.

### Collapse Bad – Transition Wars

#### Growth is inevitable – any attempt at transition is impossible and leads to global war

David R. Barnhizer, Emeritus Professor at Cleveland State University’s Cleveland-Marshall College of Law; “Waking from Sustainability's "Impossible Dream": The Decisionmaking Realities of Business and Government.” 2006 Georgetown International Environmental Law Review. 18 Geo. Int'l Envtl. L. Rev. 595 Lexis.

We face a combination of ecological, social, and economic crises. These crises involve the ability to fund potentially conflicting obligations for the provision of social benefits, health care, education, pensions, and poverty alleviation. They also include the need for massive expenditures to "fix" what we have already broken. n59 Part of the challenge is that in the United States and Europe we have made fiscal promises that we cannot keep. We also have vast economic needs for [\*620] continuing wealth generation as a precondition for achieving social equity on national and global levels. Figuring out how to reduce some of those obligations, eliminate others, and rebuild the core and vitality of our system must become a part of any honest social discourse. Even Pollyanna would be overwhelmed by the choices we face. There will be significant pain and sacrifice in any action we take. But failing to take prompt and effective action will produce even more catastrophic consequences. The scale of social needs, including the need for expanded productive activity, has grown so large that it cannot be shut off at all, and certainly not abruptly. It cannot even be ratcheted down in any significant fashion without producing serious harms to human societies and hundreds of millions of people. Even if it were possible to shift back to systems of local self-sufficiency, the consequences of the transition process would be catastrophic for many people and even deadly to the point of continual conflict, resource wars, increased poverty, and strife. What are needed are concrete, workable, and pragmatic strategies that produce effective and intelligently designed economic activity in specific contexts and, while seeking efficiency and conservation, place economic and social justice high on a list of priorities. n60 The imperative of economic growth applies not only to the needs and expectations of people in economically developed societies but also to people living in nations that are currently economically underdeveloped. Opportunities must be created, jobs must be generated in huge numbers, and economic resources expanded to address the tragedies of poverty and inequality. Unfortunately, natural systems must be exploited to achieve this; we cannot return to Eden. The question is not how to achieve a static state but how to achieve what is needed to advance social justice while avoiding and mitigating the most destructive consequences of our behavior. Many developing country groups involved in efforts to protect the environment and resist the impacts of free trade on their communities have been concerned with the harmful effects of economic change. Part of the concern is the increased scale of economic activity. Some concerns relate to who benefits and who loses in the changing context imposed by globalization. These concerns are legitimate and understandable. So are the other deep currents running beneath their political positions, including those of resistance to change of any kind and a [\*621] rejection of the market approach to economic activities. In the system described inaccurately as free market capitalism, economic activity not only breaks down existing systems, it creates new systems and--as Joseph Schumpeter observed--continually repeats the process through cycles of "creative destruction." n61 This pattern of creative destruction unfolds as necessarily and relentlessly as does the birth-maturation-death-rebirth cycle of the natural environment. This occurs even in a self-sufficient or autarkic market system capable of managing all variables within its closed dominion. But when the system breaks out of its closed environment, the ability of a single national actor to control the system's dynamics erodes and ultimately disappears in the face of differential conditions, needs, priorities, and agendas. Globalization's ability to produce wealth for a particular group simultaneously produces harms to different people and interests and generates unfair resource redistribution within existing cultures. This is an unavoidable consequence of globalization. n62 The problem is that globalization has altered the rules of operation of political, economic, and social activities, and in doing so multiplied greatly our ability to create benefit and harm. n63 While some understandably want the unsettling and often chaotic effects of globalization to go away, it can only be dealt with, not reversed. The system in which we live and work is no longer closed. There are few contexts not connected to the dynamics of some aspect of the extended economic and social systems resulting from globalization. This means the wide ranging and incompatible variables of a global economic, human rights, and social fairness system are resulting in conflicts and unanticipated interpenetrations that no one fully understands, anticipates, or controls. n64 Local [\*622] self-sufficiency is the loser in this process. It can remain a nostalgic dream but rarely a reality. Except for isolated cultures and niche activities, there is very little chance that anyone will be unaffected by this transformational process. Change is the constant, and it will take several generations before we return to a period of relative stasis. Even then it will only be a respite before the pattern once again intensifies.

### Collapse Bad – Transition Wars

#### Transition Wars

Perry Anderson, Professor of Sociology at UCLA, Marxist Scholar, 1984, In the tracks of historical materialism, p. 102-103)

That background also indicates, however, what is essentially missing from his work. How are we to get from where we are today to where he point us to tomorrow? There is no answer to this question in Nove. His halting discussion of “transition” tails away into apprehensive admonitions to moderation to the British Labor Party, and pleas for proper compensation to capitalist owners of major industries, if these are to be nationalized. Nowhere is there any sense of what a titanic political change would have to occur, with what fierceness of social struggle, for the economic model of socialism he advocates ever to materialize. Between the radicalism of the future end-state he envisages, and the conservatism of the present measures he is prepared to countenance, there is an unbridgeable abyss. How could private ownership of the means of production ever be abolished by policies less disrespectful of capital than those of Allende or a Benn, which he reproves? What has disappeared from the pages of The Economics of Feasible Socialism is virtually all attention to the historical dynamics of any serious conflict over the control of the means of production, as the record of the 20th century demonstrates them. If capital could visit such destruction on even so poor and small an outlying province of its empire in Vietnam, to prevent its loss, is it likely that it would suffer its extinction meekly in its own homeland? The lessons of the past sixty-five years or so are in this respect without ambiguity or exception, there is no case, from Russia to China, from Vietnam to Cuba, from Chile to Nicaragua, where the existence of capitalism has been challenged, and the furies of intervention, blockade and civil strife have not descended in response. Any viable transition to socialism in the West must seek to curtail that pattern: but to shrink from or to ignore it is to depart from the world of the possible altogether. In the same way, to construct an economic model of socialism in one advanced country is a legitimate exercise: but to extract it from any computable relationship with a surrounding, and necessarily opposing, capitalist environment—as this work does—is to locate it in thin air

### Collapse Bad – Environment

#### Economic collapse causes a last ditch effort to grab resources – destroys the environment

David Ehrenfeld, Dept. of Ecology, Evolution, and Natural Resources @ Rutgers University, April 2005, “The Environmental Limits to Globalization,” Conservation Biology, Pages 318–326 Volume 19, No. 2, April 2005, Ebsco.

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.

### Growth Good – Environment

#### Tech and markets solve ecological destruction

Jonathan H. Adler, Professor of Law and Director of the Center for Business Law and Regulation at Case Western Reserve University School of Law, Fall 2008, “Green Bride to Nowhere,” The New Atlantis, http://www.thenewatlantis.com/publications/green-bridge-to-nowhere

According to Speth, “most environmental deterioration is a result of systemic failures of capitalism.” This is an odd claim, as the least capitalist nations of the world also have the worst environmental records. The ecological costs of economic statism are far worse than those of economic liberty. The environmental record of the various Soviet regimes amply bears this out: The West’s ecological nightmares were the Soviet bloc’s environmental realities. This is not due to any anomaly of the Soviet system. Nations with greater commitment to capitalist institutions experience greater environmental performance. While Speth occasionally acknowledges pockets of environmental progress, he hardly stops to consider the reasons why some environmental resources have been conserved more effectively than others. Fisheries are certainly declining throughout much of the world—some 75 percent of fisheries are fully or over-exploited—but not everywhere. It is worth asking why. Tropical forests in less-developed nations are declining even as most temperate forests in industrialized nations are rebounding. Recognizing these different trends and identifying the key variables is essential to diagnosing the real causes of environmental deterioration and prescribing a treatment that will work. Speth acknowledges that much of the world is undergoing “dematerialization,” such that economic growth far outpaces increases in resource demand, but seems not to appreciate how the capitalist system he decries creates the incentives that drive this trend. Were it not for market-driven advances in technological capability and ecological efficiency, humanity’s footprint on the Earth would be far greater. While modern civilization has developed the means to effect massive ecological transformations, it has also found ways to produce wealth while leaving more of the natural world intact. Market competition generates substantial incentives to do more with less—thus in market economies we see long and continuing improvements in productive efficiency. This can be seen everywhere from the replacement of copper with fiber optics (made from silica, the chief component in sand) and the light-weighting of packaging to the explosion of agricultural productivity and improvements in energy efficiency. Less material is used and disposed of, reducing overall environmental impacts from productive activity. The key to such improvements is the same set of institutional arrangements that Speth so decries: property rights and voluntary exchange protected by the rule of law—that is, capitalism. As research by Wheaton College economist Seth Norton and many others has shown, societies in which property rights and economic freedoms are protected experience superior economic and environmental performance than those societies subject to greater government control. Indeed, such institutions have a greater effect on environmental performance than the other factors, such as population growth, that occupy the attention of Speth and so many other environmental thinkers. Speth complains that capitalism is fundamentally biased against the future; but the marketplace does a far better job of pricing and accounting for future interests than the political alternative. “Future generations cannot participate in capitalism’s markets [today],” says Speth. Fair enough, but they cannot vote or engage in the regulatory process either. Thus the relevant policy question is what set of institutions does the best—or least bad—job of accounting for such concerns, and here there is no contest. However present-oriented the marketplace may be, it is better able to look past the next election cycle than any plausibly democratic alternative. Speth pays lip service to the virtues of markets, but he still calls for a replacement of the capitalist system with something else. He acknowledges that “no better system of allocating scarce resources has yet been invented” than capitalism, and yet can’t seem to grasp why. He tries to define and dissect the nature of capitalist economics, but is unable to distill its essence. Quoting neo-Marxist critiques is not a likely path to enlightenment about the market economy. Insofar as firms in the marketplace seek to “externalize” the costs of economic activity (such as by polluting) or “rent seek” to receive special benefits from government, they are seeking to escape the market discipline fostered by capitalist economics, rather than participate in it. Voluntary exchange of private rights is central to the market process. When firms obtain goods or services, such as natural resources or waste disposal, without contracting for them, firms are acting outside of the market process and free from market discipline. If the goal is to “internalize” the environmental effects of economic activity, the most fruitful course is to expand market institutions, rather than impose additional layers of political controls.

### Growth Good – Environment

#### Kuznets curve means growth saves the environment

John Tierney, science columnist for the New York Times, journalism degree from Yale U, cites Nobel Prize winning economist Simon Kuznets, Ph.D from Columbia U, 4-20-2009, [tierneylab.blogs.nytimes.com/2009/04/20/the-richer-is-greener-curve/

In my Findings column, I explain how researchers have discovered that, over the long term, being richer often translates into being greener. Many environmental problems get worse as a country first industrializes, but once it reaches a certain level of income, the trend often reverses, producing a curve shaped like an upside-down U. It’s called a Kuznets curve (in honor of the economist Simon Kuznets, who detected this pattern in trends of income inequality). As promised in the column, here are some graphic examples of Kuznets curves for sulphur dioxide pollution, as measured in an assortment of rich and poor countries, and also as measured over time in the United States. Each line is an environmental Kuznets curve for a group of countries during the 1980s. The levels of sulphur dioxide pollution (the vertical axis) rise as countries becomes more affluent (the horizontal axis). But then, once countries reach an economic turning point (a gross domestic product close to $8,000 per capita), the trend reverses and air pollution declines as countries get richer. In this analysis by Xiang Dong Qin of Clemson University, the green line shows countries with strong protections for property rights; the red curve shows countries with weaker protections. I’m not trying to argue that all environmental problems fit these curves, or that these improvements happen automatically. How fast the environment improves depends not just on money but on whether a country has an effective government, educated citizens, healthy institutions and the right laws. (For discussions of the variability of these curves and the factors that affect them, see this PERC report by a group led by Bruce Yandle of Clemson University and this article in Environment, Development and Sustainability by Kuheli Dutt of Northeastern University.) But rising incomes can make it more likely that improvements will come, and these Kuznets curves give more reason for optimism than the old idea that economic growth endangered the planet. In the 1970s, rich countries were urged to “de-develop” by Paul Ehrlich and John P. Holdren, now the White House science adviser. I welcome your thoughts on what can be learned from Kuznets curves — and whether people at opposite ends of the curves can find common ground. As America got richer in the the 20th century, emissions of sulphur dioxide rose. But thanks to new technologies, new laws and new desires for cleaner air, the trend reversed, and sulphur-dioxide pollution declined even though population and wealth kept rising.

### Growth Good – Environment

#### Strong data supports Kuznets

Jerry Taylor, director of natural resource studies at the Cato Institute, adjunct scholar at the Institute for Energy Research, 4-23-2003, www.connectusfund.org/resources/happy-earth-day-thank-capitalism

Indeed, we wouldn't even have environmentalists in our midst were it not for capitalism. Environmental amenities, after all, are luxury goods. America -- like much of the Third World today -- had no environmental movement to speak of until living standards rose sufficiently so that we could turn our attention from simply providing for food, shelter, and a reasonable education to higher "quality of life" issues. The richer you are, the more likely you are to be an environmentalist. And people wouldn't be rich without capitalism. Wealth not only breeds environmentalists, it begets environmental quality. There are dozens of studies showing that, as per capita income initially rises from subsistence levels, air and water pollution increases correspondingly. But once per capita income hits between $3,500 and $15,000 (dependent upon the pollutant), the ambient concentration of pollutants begins to decline just as rapidly as it had previously increased. This relationship is found for virtually every significant pollutant in every single region of the planet. It is an iron law. Given that wealthier societies use more resources than poorer societies, such findings are indeed counterintuitive. But the data don't lie. How do we explain this? The obvious answer -- that wealthier societies are willing to trade-off the economic costs of government regulation for environmental improvements and that poorer societies are not -- is only partially correct. In the United States, pollution declines generally predated the passage of laws mandating pollution controls. In fact, for most pollutants, declines were greater before the federal government passed its panoply of environmental regulations than after the EPA came upon the scene. Much of this had to do with individual demands for environmental quality. People who could afford cleaner-burning furnaces, for instance, bought them. People who wanted recreational services spent their money accordingly, creating profit opportunities for the provision of untrammeled nature. Property values rose in cleaner areas and declined in more polluted areas, shifting capital from Brown to Green investments. Market agents will supply whatever it is that people are willing to spend money on. And when people are willing to spend money on environmental quality, the market will provide it. Meanwhile, capitalism rewards efficiency and punishes waste. Profit-hungry companies found ingenious ways to reduce the natural resource inputs necessary to produce all kinds of goods, which in turn reduced environmental demands on the land and the amount of waste that flowed through smokestacks and water pipes. As we learned to do more and more with a given unit of resources, the waste involved (which manifests itself in the form of pollution) shrank. This trend was magnified by the shift away from manufacturing to service industries, which characterizes wealthy, growing economies. The latter are far less pollution-intensive than the former. But the former are necessary prerequisites for the latter. Property rights -- a necessary prerequisite for free market economies -- also provide strong incentives to invest in resource health. Without them, no one cares about future returns because no one can be sure they'll be around to reap the gains. Property rights are also important means by which private desires for resource conservation and preservation can be realized. When the government, on the other hand, holds a monopoly on such decisions, minority preferences in developing societies are overruled (see the old Soviet block for details). Furthermore, only wealthy societies can afford the investments necessary to secure basic environmental improvements, such as sewage treatment and electrification. Unsanitary water and the indoor air pollution (caused primarily by burning organic fuels in the home for heating and cooking needs) are directly responsible for about 10 million deaths a year in the Third World, making poverty the number one environmental killer on the planet today. Capitalism can save more lives threatened by environmental pollution than all the environmental organizations combined. Finally, the technological advances that are part and parcel of growing economies create more natural resources than they consume. That's because what is or is not a "natural resource" is dependent upon our ability to harness the resource in question for human benefit. Resources are therefore a function of human knowledge. Because the stock of human knowledge increases faster in free economies than it does in socialist economies, it should be no surprise that most natural resources in the western world are more abundant today than ever before no matter which measure one uses.

### Growth Good – Singularity

#### The singularity is coming soon – solves warming, all global problems, and makes us immortal

Ray Kurzweil, a computer scientist and inventor, 4-13-2008, “Making the World A Billion Times Better,” Washington Post, http://www.washingtonpost.com/wp-dyn/content/article/2008/04/11/AR2008041103326.html

Yet as powerful as information technology is today, we will make another billion-fold increase in capability (for the same cost) over the next 25 years. That's because information technology builds on itself -- we are continually using the latest tools to create the next so they grow in capability at an exponential rate. This doesn't just mean snazzier cellphones. It means that change will rock every aspect of our world. The exponential growth in computing speed will unlock a solution to global warming, unmask the secret to longer life and solve myriad other worldly conundrums. This exponential progress in the power of information technology goes back more than a century to the data-processing equipment used in the 1890 census, the first U.S. census to be automated. It has been a smooth -- and highly predictable -- phenomenon despite all the vagaries of history through that period, including two world wars, the Cold War and the Great Depression. I say highly predictable because, thanks to its exponential power, only technology possesses the scale to address the major challenges -- such as energy and the environment, disease and poverty -- confronting society. That, at least, is the major conclusion of a panel, organized by the National Science Foundation and the National Academy of Engineering, on which I recently participated. ad\_icon Take energy. Today, 70 percent of it comes from fossil fuels, a 19th-century technology. But if we could capture just one ten-thousandth of the sunlight that falls on Earth, we could meet 100 percent of the world's energy needs using this renewable and environmentally friendly source. We can't do that now because solar panels rely on old technology, making them expensive, inefficient, heavy and hard to install. But a new generation of panels based on nanotechnology (which manipulates matter at the level of molecules) is starting to overcome these obstacles. The tipping point at which energy from solar panels will actually be less expensive than fossil fuels is only a few years away. The power we are generating from solar is doubling every two years; at that rate, it will be able to meet all our energy needs within 20 years. Nanotechnology itself is an information technology and therefore subject to what I call the "law of accelerating returns," a continual doubling of capability about every year. Venture capital groups and high-tech companies are investing billions of dollars in these new renewable energy technologies. I'm confident that the day is close at hand when we will be able to obtain energy from sunlight using nano-engineered solar panels and store it for use on cloudy days in nano-engineered fuel cells for less than it costs to use environmentally damaging fossil fuels. It's important to understand that exponentials seem slow at first. In the mid-1990s, halfway through the Human Genome Project to identify all the genes in human DNA, researchers had succeeded in collecting only 1 percent of the human genome. But the amount of genetic data was doubling every year, and that is actually right on schedule for an exponential progression. The project was slated to take 15 years, and if you double 1 percent seven more times you surpass 100 percent. In fact, the project was finished two years early. This helps explain why people underestimate what is technologically feasible over long periods of time -- they think linearly while the actual course of progress is exponential. We see the same progression with other biological technologies as well. Until just recently, medicine -- like energy -- was not an information technology. This is now changing as scientists begin to understand how biology works as a set of information processes. The approximately 23,000 genes in our cells are basically software programs, and we are making exponential gains in modeling and simulating the information processes that cracking the genome code has unlocked. We also have new tools, likewise just a few years old, that allow us to actually reprogram our biology in the same way that we reprogram our computers. For example, when the fat insulin receptor gene was turned off in mice, they were able to eat ravenously yet remain slim and obtain the health benefits of being slim. They didn't get heart disease or diabetes and lived 20 percent longer. There are now more than a thousand drugs in the pipeline to turn off the genes that promote obesity, heart disease, cancer and other diseases. We can also turn enzymes off and on, and add genes to the body. I'm an adviser to a company that removes lung cells, adds a new gene, reproduces the gene-enhanced cell a million-fold and then injects it back into the body where it returns to the lungs. This has cured a fatal disease, pulmonary hypertension, in animals and is now undergoing human trials. The important point is this: Now that we can model, simulate and reprogram biology just like we can a computer, it will be subject to the law of accelerating returns, a doubling of capability in less than a year. These technologies will be more than a thousand times more capable in a decade, more than a million times more capable in two decades. We are now adding three months every year to human life expectancy, but given the exponential growth of our ability to reprogram biology, this will soon go into high gear. According to my models, 15 years from now we'll be adding more than a year each year to our remaining life expectancy. This is not a guarantee of living forever, but it does mean that the sands of time will start pouring in rather than only pouring out.

### Growth Good – Try or Die

#### Try or die for growth – we can’t revert because we are beyond the tipping point

Alan Atkisson, former executive editor of In Context: A Quarterly of Humane Sustainable Culture, 3-20-2003, “Sustainability is Dead— Long Live Sustainability”,

http://www.rrcap.unep.org/uneptg06/course/Robert/SustainabilityManifesto2001.pdf

At precisely the moment when humanity’s science, technology, and economy has grown to the point that we can monitor and evaluate all the major systems that support life, all over the Earth, we have discovered that most of these systems are being systematically degraded and destroyed . . . by our science, technology, and economy. The evidence that we are beyond the limits to growth is by now overwhelming: the alarms include climatic change, disappearing biodiversity, falling human sperm counts, troubling slow-downs in food production after decades of rapid expansion, the beginning of serious international tensions over basic needs like water. Wild storms and floods and eerie changes in weather patterns are but a first visible harbinger of more serious trouble to come, trouble for which we are not adequately prepared. Indeed, change of all kinds—in the Biosphere (nature as a whole), the Technosphere (the entirety of human manipulation of nature), and the Noösphere (the collective field of human consciousness)—is happening so rapidly that it exceeds our capacity to understand it, control it, or respond to it adequately in corrective ways. Humanity is simultaneously entranced by its own power, overwhelmed by the problems created by progress, and continuing to steer itself over a cliff. Our economies and technologies are changing certain basic structures of planetary life, such as the balance of carbon in the atmosphere, genetic codes, the amount of forest cover, species variety and distribution, and the foundations of cultural identity. Unless we make technological advances of the highest order, many of the destructive changes we are causing to nature are irreversible. Extinct species cannot (yet) be brought back to life. No credible strategy for controlling or reducing carbon dioxide levels in the atmosphere has been put forward. We do not know how to fix what we’re breaking. At the same time, some of the very products of our technology— A Manifesto | 3 plutonium, for instance—require of us that we maintain a very high degree of cultural continuity, economic and political stability, and technological capacity and sophistication, far into the future. To ensure our safety and the safety of all forms of life, we must always be able to store, clean up, and contain poisons like plutonium and persistent organic toxins. Eventually we must be able to eliminate them safely. At all times, we must be able to contain the actions of evil or unethical elements in our societies who do not care about the consequences to life of unleashing our most dangerous creations. In the case of certain creations, like nuclear materials and some artificially constructed or genetically modified organisms, our secure custodianship must be maintained for thousands of years. We are, in effect, committed to a high-technology future. Any slip in our mastery over the forces now under our command could doom our descendants—including not just human descendants, but also those wild species still remaining in the oceans and wilderness areas—to unspeakable suffering. We must continue down an intensely scientific and technological path, and we can never stop.

### Growth Good – Environment

#### Environmental benefits to decline are small and overwhelmed by negative effects

Armin Bauer, Senior Economist at the Asian Development Bank, and Venkatachalam Anbumozhi, Capacity-Building Specialist at the Asian Development Bank Institute, July 2010, “Impact of Global Recession on Sustainable Development and Poverty Linkages,” http://www.adbi.org/files/2010.07.08.wp227.impact.global.recession.dev.poverty.linkages.pdf

The global financial crisis and the resulting economic slowdown may be assumed to have at least the benefit of also reducing environmental degradation in the individual countries. This paper discusses the consequences of the crisis for energy use, pollution prevention, and land use in Asia and the associated emissions of greenhouse gases—the principal global warming pollutants—as well as their linkage with poverty. There are some short-term benefits to the global environment from the economic slowdown. Such benefits include reduction in the rate of air and water pollution from reduced energy use—which has direct implications for the urban poor’s health. However, modest benefits to global and local environments arising from the economic slowdown are likely to be much smaller than the costs associated with many environmental conservation measures, related to energy savings, natural resources protection, and water environment. Both supply and demand side investments in energy and environment are being affected. Many ongoing projects are being slowed and a number of downward revisions are being made in expected profitability. Meanwhile, businesses and households are spending less on energy efficiency measures. Tighter credit and lower prices make investment in energy savings and environmental conservation less attractive financially, while the economic crisis is encouraging end users to rein in spending across the board. This is delaying the deployment of more efficient technology and equipment. Furthermore, solution providers are expected to reduce investment in research, development, and commercialization of more energy-efficient models, unless they are able to secure financial support from governments. The economic slowdown is likely to alter land use patterns by increasing the pressure to clear forests for firewood, timber, or agricultural purposes—the livelihood opportunities available with the rural poor. Further, the likely additional delay in many countries in the construction of effluent treatment plans for limiting the discharge of pollutants into the rivers is expected to harm the water environment. Thus on balance, the modest benefits to global and local environments arising from the economic slowdown are likely to be much smaller than the costs of many environmental conservation measures for improving the livelihood conditions of the poor.

### Growth Good – Wars

#### Growth leads to interdependence which solves war

Tan Tan Yee, Journal of the Singapore Armed Forces, Jan-Mar 1999, http://www.mindef.gov.sg/safti/pointer/back/journals/1999/Vol25\_1/7.htm

Like the Democratic Peace Proposition, the notion that increased interdependence reduces the probability of war among nations is not new. For one, economists have long demonstrated that economic interdependence benefits both parties through the process of international trade. The underlying rationale is worth explaining. In a simple model of a two-state-two-product international economy, even if a particular state is more efficient at producing both goods, it would still make more economic sense for each state to specialise in producing one of the goods and thereafter obtain the other through barter exchange. This is because the issue is one of relative rather than absolute efficiency; the more efficient state should optimise its limited resources to focus entirely on producing the goods where it has a relatively greater efficiency. From an economic viewpoint, therefore, international trade represents one of the rare occasions in international affairs that present a win-win situation to both parties.15 Traditionally, theories on the effect of interdependence between states on the risk of war can be divided into two main camps. On the one extreme, liberals argue that economic interdependence lowers the likelihood of war by increasing the value of trading over the alternative of aggression; in other words, states would rather trade than fight.16 To put it simply, trade is mutually beneficial, while war is at best a zero-sum game. At the same time, the increasing lethality of modern weapons has greatly increased the costs and risks of war, thus making the trading option seem even more rational. Four other subsidiary propositions supporting the liberal view are worth mentioning here.17 Firstly, the increased economic activity that accompanies higher trade levels tends to promote domestic prosperity, and in doing so lessens the internal problems that push leaders to war. Secondly, trade may alter the domestic structure of a particular state, giving more influence to groups with a vested interest in the continuation of peaceful trade. Thirdly, a higher level of interdependence inevitably leads to increased interaction between governments and peoples. This enhances understanding and an appreciation of each other's views and perspectives, reducing the misunderstandings and miscalculations that sometimes lead to war. The final argument asserts that trade has the spillover effect of enhancing political ties between trading partners, thus improving the prospects for long-term co-operation. Going by the liberal arguments, there is cause for optimism as long as a high level of interdependence can be maintained among all states. Rosecrance sums up the view rather neatly that high interdependence fosters peace by making trading more profitable than invading.18 Some liberals explain the continuing occurrence of war as a result of the misconception of political leaders caught up in the outmoded belief that war still pays.19 Yet others saw it as the misguided attempts by political leaders to gamble for an outright victory in war, in which case the benefits would be even greater. The contention is that inspite of the pacifist tendencies that interdependence brings about, it may sometimes not be enough to prevent war from happening.

### Growth Good – Wars

#### Growth solves extremism – leads to wars

Walter Russell Mead, [Henry A. Kissinger](http://en.wikipedia.org/wiki/Henry_A._Kissinger) senior fellow for [U.S. foreign policy](http://en.wikipedia.org/wiki/U.S._foreign_policy) at the Council on Foreign Relations, 2009, The New Republic, http://www.tnr.com/politics/story.html?id=571cbbb9-2887-4d81-8542-92e83915f5f8&p=2

So far, such half-hearted experiments not only have failed to work; they have left the societies that have tried them in a progressively worse position, farther behind the front-runners as time goes by. Argentina has lost ground to Chile; Russian development has fallen farther behind that of the Baltic states and Central Europe. Frequently, the crisis has weakened the power of the merchants, industrialists, financiers, and professionals who want to develop a liberal capitalist society integrated into the world. Crisis can also strengthen the hand of religious extremists, populist radicals, or authoritarian traditionalists who are determined to resist liberal capitalist society for a variety of reasons. Meanwhile, the companies and banks based in these societies are often less established and more vulnerable to the consequences of a financial crisis than more established firms in wealthier societies. As a result, developing countries and countries where capitalism has relatively recent and shallow roots tend to suffer greater economic and political damage when crisis strikes--as, inevitably, it does. And, consequently, financial crises often reinforce rather than challenge the global distribution of power and wealth. This may be happening yet again. None of which means that we can just sit back and enjoy the recession. History may suggest that financial crises actually help capitalist great powers maintain their leads--but it has other, less reassuring messages as well.If financial crises have been a normal part of life during the 300-year rise of the liberal capitalist system under the Anglophone powers, so has war. The wars of the League of Augsburg and the Spanish Succession; the Seven Years War; the American Revolution; the Napoleonic Wars; the two World Wars; the cold war: The list of wars is almost as long as the list of financial crises. Bad economic times can breed wars. Europe was a pretty peaceful place in 1928, but the Depression poisoned German public opinion and helped bring Adolf Hitler to power. If the current crisis turns into a depression, what rough beasts might start slouching toward Moscow, Karachi, Beijing, or New Delhi to be born? The United States may not, yet, decline, but, if we can't get the world economy back on track, we may still have to fight.

### AT: Resource Wars

#### Resource wars are rare and renewable energy solves the internal link

Thomas Homer-Dixon, Director of the Centre for the Study of Peace and Conflict ,Professor of Political Science, at the University of Toronto, 1999, Environment, Scarcity, and Violence, pp. 138-139

Four environmental resources in particular would appear likely to spark simple-scarcity conflicts: agriculturally productive land, forests, river water, and fish. Scarcity of these renewables is rising rapidly in some regions; they are often essential for human survival; and they can be physically seized or controlled. But close study of historical and current cases provides little support for this idea. There is, in fact, virtually no evidence that environmental scarcity is a principal cause of major war among modern states. Arthur Westing has compiled a list of twelve conflicts in the twentieth centuiy involving resources, beginning with World War I and concluding with the Falklands/Malvinas War. Access to oil or minerals was at issue in ten of these conflicts. Just five involved renewable resources, and only two of these—the 1969 Soccer War between El Salvador and Honduras, and the Anglo-Icelandic Cod War of 1972—1973—concerned neither oil nor minerals (cropland was a factor in the former case, and fish in the latter). But, the Soccer War was not a simple-scarcity conflict between states; rather, as explained later in this chapter, it arose from the ecological marginalization of El Salvadoran peasants and their consequent migration into Honduras. And, because the Cod War, despite its name, involved negligible violence, it hardly qualifies as a resource war. In general, scholars such as Choucri and North have not adequately distinguished between scarcities of renewable and nonrenewable resources as causes of international conflict. They have overlooked two reasons why modern states do not generally fight over renewable resources. First, states cannot easily convert cropland, forests, and fish seized from a neighbor into increased state power; although these resources may eventually generate wealth that can be hamessed by the state for its own ends, this outcome is uncertain and remote in time. In contrast, states can quickly use nonrenewables like oil and iron to build and fuel the military machines of national aggression. (Renewables have not always been less important to state power: in the seventeenth through nineteenth centuries, for example, shortages of timber for naval ships contributed to serious, and sometimes violent, conflict among European powers.) Second, countries with economies highly dependent on renewables tend to be poor, and poor countries cannot easily buy large and sophisticated conventional armies to attack their neighbors. For these reasons, both the incentives and the means to launch resource wars are likely to be lower for renewables than for nonrenewables.