# Round 1 – Aff v Harvard BN

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### Plan

#### The United States federal government should substantially increase loan guarantees for integral fast reactors using the S-PRISM design.

### Nuclear Leadership

#### Adv 1: Nuclear leadership

#### Nuclear power is inevitable – Inaction on IFRs is killing US nuclear leadership

**Shuster 11** [Joseph Shuster, founder of Minnesota Valley Engineering and Chemical Engineer, 9-8-2011, "Response to Draft Report From Obama’s Blue Ribbon Commission (BRC) on America’s Nuclear Future dated July 29, 2011," Beyond Fossil Fools]

Contrary to the commission’s declarations on the matter, the U.S. is in danger of losing its once ¶ strong nuclear leadership. As a result we would have less to say about how nuclear materials are ¶ to be managed in the world and that could expose the U.S. to some inconvenient if not downright ¶ dangerous consequences. China is now building a large pilot plant said to be identical to our ¶ successful EBR-II plant that proved the design of the IFR. Meanwhile in the U.S. after complete ¶ success, EBR II was shut down, not for technical reasons but for political reasons during the ¶ Clinton administration, a decision destined to be one of the worst in our nation’s history.¶ Much of the world is already committed to a nuclear future with some countries eagerly waiting ¶ to license the American version of Generation IV Fast Reactors—the IFR. We still have the best ¶ IFR technology in the world but have squandered much of our lead, partly by allowing a largely ¶ unqualified commission two years of useless deliberation. What we really did was give our ¶ competitors an additional two years to catch up.

#### IFR restores leadership on nuclear issues – key to contain proliferation

**Stanford 10** (Dr George S. Stanford, nuclear reactor physicist, retired from Argonne National Laboratory, "IFR FaD context – the need for U.S. implementation of the IFR," 2/18/10) http://bravenewclimate.com/2010/02/18/ifr-fad-context/-http://bravenewclimate.com/2010/02/18/ifr-fad-context/

ON THE NEED FOR U.S. IMPLEMENTATION OF THE INTEGRAL FAST REACTOR¶ The IFR ties into a very big picture — international stability, prevention of war, and avoiding “proliferation” (spread) of nuclear weapons.¶ – The need for energy is the basis of many wars, including the ones we are engaged in right now (Iraq and Afghanistan). If every nation had enough energy to give its people a decent standard of living, that reason for conflict would disappear.¶ – The only sustainable energy source that can provide the bulk of the energy needed is nuclear power.¶ – The current need is for more thermal reactors — the kind we now use.¶ – But for the longer term, to provide the growing amount of energy that will be needed to maintain civilization, the only proven way available today is with fast-reactor technology.¶ – The most promising fast-reactor type is the IFR – metal-fueled, sodium-cooled, with pyroprocessing to recycle its fuel.¶ – Nobody knows yet how much IFR plants would cost to build and operate. Without the commercial-scale demo of the IFR, along with rationalization of the licensing process, any claims about costs are simply hand-waving guesses.¶ \* \* \* \*¶ Background info on proliferation (of nuclear weapons). Please follow the reasoning carefully.¶ – Atomic bombs can be made with highly enriched uranium (90% U-235) or with good-quality plutonium (bomb designers want plutonium that is ~93% Pu-239).¶ – For fuel for an LWR, the uranium only has to be enriched to 3 or 4% U-235.¶ – To make a uranium bomb you don’t need a reactor — but you do need access to an enrichment facility or some other source of highly enriched uranium…¶ – Any kind of nuclear reactor can be used to make weapons-quality plutonium from uranium-238, but the uranium has to have been irradiated for only a very short period. In other words, nobody would try to make a plutonium weapon from ordinary spent fuel, because there are easier ways to get plutonium of much better quality.¶ – Plutonium for a weapon not only has to have good isotopic quality, it also has to be chemically uncontaminated. Thus the lightly irradiated fuel has to be processed to extract the plutonium in a chemically pure form. But mere possession of a reactor is not sufficient for a weapons capability — a facility using a chemical process called PUREX is also needed.¶ – Regardless of how many reactors a country has, it cannot have a weapons capability unless it has either the ability to enrich uranium or to do PUREX-type fuel reprocessing.¶ – Therefore, the spread of weapons capability will be strongly inhibited if the only enrichment and reprocessing facilities are in countries that already have a nuclear arsenal.¶ – But that can only happen if countries with reactors (and soon that will be most of the nations of the world) have absolutely ironclad guarantees that they can get the fuel they need even if they can’t make their own, regardless of how obnoxious their political actions might be.¶ – Such guarantees will have to be backed up by some sort of international arrangement, and that can only come to pass if there is effective leadership for the laborious international negotiations that will have to take place. (For a relevant discussion, see here)¶ – At present, the only nation that has a realistic potential to be such a leader is the United States.¶ – But a country cannot be such a leader in the political arena unless it is also in the technological forefront.¶ – The United States used to be the reactor-technology leader, but it abandoned that role in 1994 when it terminated the development of the IFR.¶ – Since then, other nations — China, India, Japan, South Korea, Russia, France — have proceeded to work on their own fast-reactor versions, which necessarily will involve instituting a fuel-processing capability.¶ – Thus the United States is being left behind, and is rapidly losing its ability to help assure that the global evolution of the technology of nuclear energy proceeds in a safe and orderly manner.¶ – But maybe it’s not too late yet. After all, the IFR is the fast-reactor technology with the post promise (for a variety of reasons), and is ready for a commercial-scale demonstration to settle some uncertainties about how to scale up the pyroprocess as needed, to establish better limits on the expected cost of production units, and to develop an appropriate, expeditious licensing process.¶ – Such a demo will require federal seed money. It’s time to get moving.

#### Several impacts – 1st prolif

#### Transition to IFRs create a global proliferation resistant fuel cycle

**Stanford 10** (Dr George S. Stanford, nuclear reactor physicist, retired from Argonne National Laboratory, "Q%26A on Integral Fast Reactors – safe, abundant, non-polluting power," 9/18/10) <http://bravenewclimate.com/2010/09/18/ifr-fad-7/-http://bravenewclimate.com/2010/09/18/ifr-fad-7/>

Thermal reactors with reprocessing would do at least a little better.¶ Recycling (it would be with the PUREX process, or an equivalent) could stretch the U-235 supply another few decades—but remember the consequences: growing stockpiles of plutonium, pure plutonium streams in the PUREX plants, and the creation of 100,000-year plutonium mines.¶ If you’re going to talk about “PUREX” and “plutonium mines” you should say what they are. First, what’s PUREX?¶ It’s a chemical process developed for the nuclear weapons program, to separate plutonium from everything else that comes out of a reactor. Weapons require very pure plutonium, and that’s what PUREX delivers. The pyroprocess used in the IFR is very different. It not only does not, it cannot, produce plutonium with the chemical purity needed for weapons.¶ Why do you keep referring to “chemical” purity?¶ Because chemical and isotopic quality are two different things. Plutonium for a weapon has to be pure chemically. Weapons designers also want good isotopic quality—that is, they want at least 93% of their plutonium to consist of the isotope Pu- 239. A chemical process does not separate isotopes.¶ I see. Now, what about the “plutonium mines?”¶ When spent fuel or vitrified reprocessing waste from thermal reactors is buried, the result is a concentrated geological deposit of plutonium. As its radioactivity decays, those deposits are sources of raw material for weapons, becoming increasingly attractive over the next 100,000 years and more (the half-life of Pu-239 being 24,000 years).¶ You listed, back at the beginning, some problems that the IFR would ameliorate. A lot of those problems are obviously related to proliferation of nuclear weapons.¶ Definitely. For instance, although thermal reactors consume more fuel than they produce, and thus are not called “breeders,” they inescapably are prolific breeders of plutonium, as I said. And that poses serious concerns about nuclear proliferation. And proliferation concerns are even greater when fuel from thermal reactors is recycled, since the PUREX method is used. IFRs have neither of those drawbacks.¶ Why does it seem that there is more proliferation-related concern about plutonium than about uranium? Can’t you make bombs from either?¶ Yes. The best isotopes for nuclear explosives are U-235, Pu- 239, and U-233. Only the first two of those, however, have been widely used. All the other actinide isotopes, if present in appreciable quantity, in one way or another complicate the design and construction of bombs and degrade their performance. Adequate isotopic purity is therefore important, and isotopic separation is much more difficult than chemical separation. Even so, with plutonium of almost any isotopic composition it is technically possible to make an explosive (although designers of military weapons demand plutonium that is at least 93% Pu-239), whereas if U-235 is sufficiently diluted with U-238 (which is easy to do and hard to undo), the mixture cannot be used for a bomb.¶ High-quality plutonium is the material of choice for a large and sophisticated nuclear arsenal, while highly enriched uranium would be one of the easier routes to a few crude nuclear explosives.¶ So why the emphasis on plutonium?¶ You’re asking me to read people’s minds, and I’m not good at that. Both uranium and plutonium are of proliferation concern.¶ Where is the best place for plutonium?¶ Where better than in a reactor plant—particularly an IFR facility, where there is never pure plutonium (except some, briefly, when it comes in from dismantled weapons), where the radioactivity levels are lethal, and where the operations are done remotely under an inert, smothering atmosphere? Once enough IFRs are deployed, there never will need to be plutonium outside a reactor plant—except for the then diminishing supply of plutonium left over from decades of thermal-reactor operation.¶ How does the IFR square with U.S. policy of discouraging plutonium production, reprocessing and use?¶ It is entirely consistent with the intent of that policy—to render plutonium as inaccessible for weapons use as possible. The wording of the policy, however, is now obsolete.¶ How so?¶ It was formulated before the IFR’s pyroprocessing and electrorefining technology was known—when “reprocessing” was synonymous with PUREX, which creates plutonium of the chemical purity needed for weapons. Since now there is a fuel cycle that promises to provide far-superior management of plutonium, the policy has been overtaken by events.¶ Why is the IFR better than PUREX? Doesn’t “recycling” mean separation of plutonium, regardless of the method?¶ No, not in the IFR—and that misunderstanding accounts for some of the opposition. The IFR’s pyroprocessing and electrorefining method is not capable of making plutonium that is pure enough for weapons. If a proliferator were to start with IFR material, he or she would have to employ an extra chemical separation step.¶ But there is plutonium in IFRs, along with other fissionable isotopes. Seems to me that a proliferator could take some of that and make a bomb.¶ Some people do say that, but they’re wrong, according to expert bomb designers at Livermore National Laboratory. They looked at the problem in detail, and concluded that plutonium-bearing material taken from anywhere in the IFR cycle was so ornery, because of inherent heat, radioactivity and spontaneous neutrons, that making a bomb with it without chemical separation of the plutonium would be essentially impossible—far, far harder than using today’s reactor-grade plutonium.¶ So? Why wouldn’t they use chemical separation?¶ First of all, they would need a PUREX-type plant—something that does not exist in the IFR cycle.¶ Second, the input material is so fiendishly radioactive that the processing facility would have to be more elaborate than any PUREX plant now in existence. The operations would have to be done entirely by remote control, behind heavy shielding, or the operators would die before getting the job done. The installation would cost millions, and would be very hard to conceal.¶ Third, a routine safeguards regime would readily spot any such modification to an IFR plant, or diversion of highly radioactive material beyond the plant.¶ Fourth, of all the ways there are to get plutonium—of any isotopic quality—this is probably the all-time, hands-down hardest.¶ The Long Term¶ Does the plutonium now existing and being produced by thermal reactors raise any proliferation concerns for the long term?¶ It certainly does. As I said earlier, burying the spent fuel from today’s thermal reactors creates geological deposits of plutonium whose desirability for weapons use is continually improving. Some 30 countries now have thermal-reactor programs, and the number will grow. To conceive of that many custodial programs being maintained effectively for that long is a challenge to the imagination. Since the IFR can consume plutonium, it can completely eliminate this long-term concern.¶ Are there other waste-disposal problems that could be lessened?¶ Yes. Some constituents of the waste from thermal reactors remain appreciably radioactive for thousands of years, leading to 10,000-year stability criteria for disposal sites. Waste disposal would be simpler if that time frame could be shortened. With IFR waste, the time of concern is less than 500 years.¶ What about a 1994 report by the National Academy of Sciences? The Washington Post said that the NAS report “denounces the idea of building new reactors to consume plutonium.”¶ That characterization of the report is a little strong, but it is true that the members of the NAS committee seem not to have been familiar with the plutonium-management potential of the IFR. They did, however, recognize the “plutonium mine” problem. They say (Executive Summary, p.3):¶ Because plutonium in spent fuel or glass logs incorporating high-level wastes still entails a risk of weapons use, and because the barrier to such use diminishes with time as the radioactivity decays, consideration of further steps to reduce the long-term proliferation risks of such materials is required, regardless of what option is chosen for [near-term] disposition of weapons plutonium. This global effort should include continued consideration of more proliferation-resistant nuclear fuel cycles, including concepts that might offer a long-term option for nearly complete elimination of the world’s plutonium stocks. The IFR, obviously, is just such a fuel cycle—a prime candidate for “continued consideration.”

#### We’re on the brink of rapid prolif – access to tech is inevitable and multilateral institutions fail

**CFR 12** [CFR 7-5-2012, "The Global Nuclear Nonproliferation Regime," Council on Foreign Relations]

Nuclear weapons proliferation, whether by state or nonstate actors, poses one of the greatest threats to international security today. Iran's apparent efforts to acquire nuclear weapons, what amounts to North Korean nuclear blackmail, and the revelation of the A.Q. Khan black market nuclear network all underscore the far-from-remote possibility that a terrorist group or a so-called rogue state will acquire weapons of mass destruction or materials for a dirty bomb.¶ The problem of nuclear proliferation is global, and any effective response must also be multilateral. Nine states (China, France, India, Israel, North Korea, Pakistan, Russia, the United Kingdom, and the United States) are known or believed to have nuclear weapons, and more than thirty others (including Japan, Germany, and South Korea) have the technological ability to quickly acquire them. Amid volatile energy costs, the accompanying push to expand nuclear energy, growing concerns about the environmental impact of fossil fuels, and the continued diffusion of scientific and technical knowledge, access to dual-use technologies seems destined to grow.¶ In the background, a nascent global consensus regarding the need for substantial nuclear arms reductions, if not complete nuclear disarmament, has increasingly taken shape. In April 2009, for instance, U.S. president Barack Obama reignited global nonproliferation efforts through a landmark speech in Prague. Subsequently, in September of the same year, the UN Security Council (UNSC) unanimously passed Resolution 1887, which called for accelerated efforts toward total nuclear disarmament. In February 2012, the number of states who have ratified the Comprehensive Test Ban Treaty increased to 157, heightening appeals to countries such as the United States, Israel, and Iran to follow suit.¶ Overall, the existing global nonproliferation regime is a highly developed example of international law. Yet, despite some notable successes, existing multilateral institutions have failed to prevent states such as India, Pakistan, and North Korea from "going nuclear," and seem equally ill-equipped to check Iran as well as potential threats from nonstate, terrorist groups. The current framework must be updated and reinforced if it is to effectively address today's proliferation threats, let alone pave the way for "the peace and security of a world without nuclear weapons."

#### New proliferators will be uniquely destabilizing -- guarantees conflict escalation.

Cimbala, ‘8

[Stephen, Distinguished Prof. Pol. Sci. – Penn. State Brandywine, Comparative Strategy, “Anticipatory Attacks: Nuclear Crisis Stability in Future Asia”, 27, InformaWorld]

If the possibility existed of a mistaken preemption during and immediately after the Cold War, between the experienced nuclear forces and command systems of America and Russia, then it may be a matter of even more concern with regard to states with newer and more opaque forces and command systems. In addition, the Americans and Soviets (and then Russians) had a great deal of experience getting to know one another’s military operational proclivities and doctrinal idiosyncrasies, including those that might influence the decision for or against war. Another consideration, relative to nuclear stability in the present century, is that the Americans and their NATO allies shared with the Soviets and Russians a commonality of culture and historical experience. Future threats to American or Russian security from weapons of mass destruction may be presented by states or nonstate actors motivated by cultural and social predispositions not easily understood by those in the West nor subject to favorable manipulation during a crisis. The spread of nuclear weapons in Asia presents a complicated mosaic of possibilities in this regard. States with nuclear forces of variable force structure, operational experience, and command-control systems will be thrown into a matrix of complex political, social, and cultural crosscurrents contributory to the possibility of war. In addition to the existing nuclear powers in Asia, others may seek nuclear weapons if they feel threatened by regional rivals or hostile alliances. Containment of nuclear proliferation in Asia is a desirable political objective for all of the obvious reasons. Nevertheless, the present century is unlikely to see the nuclear hesitancy or risk aversion that marked the Cold War, in part, because the military and political discipline imposed by the Cold War superpowers no longer exists, but also because states in Asia have new aspirations for regional or global respect.12 The spread of ballistic missiles and other nuclear-capable delivery systems in Asia, or in the Middle East with reach into Asia, is especially dangerous because plausible adversaries live close together and are already engaged in ongoing disputes about territory or other issues.13 The Cold War Americans and Soviets required missiles and airborne delivery systems of intercontinental range to strike at one another’s vitals. But short-range ballistic missiles or fighter-bombers suffice for India and Pakistan to launch attacks at one another with potentially “strategic” effects. China shares borders with Russia, North Korea, India, and Pakistan; Russia, with China and NorthKorea; India, with Pakistan and China; Pakistan, with India and China; and so on. The short flight times of ballistic missiles between the cities or military forces of contiguous states means that very little time will be available for warning and attack assessment by the defender. Conventionally armed missiles could easily be mistaken for a tactical nuclear first use. Fighter-bombers appearing over the horizon could just as easily be carrying nuclear weapons as conventional ordnance. In addition to the challenges posed by shorter flight times and uncertain weapons loads, potential victims of nuclear attack in Asia may also have first strike–vulnerable forces and command-control systems that increase decision pressures for rapid, and possibly mistaken, retaliation. This potpourri of possibilities challenges conventional wisdom about nuclear deterrence and proliferation on the part of policymakers and academic theorists. For policymakers in the United States and NATO, spreading nuclear and other weapons of mass destruction in Asia could profoundly shift the geopolitics of mass destruction from a European center of gravity (in the twentieth century) to an Asian and/or Middle Eastern center of gravity (in the present century).14 This would profoundly shake up prognostications to the effect that wars of mass destruction are now passe, on account of the emergence of the “Revolution in Military Affairs” and its encouragement of information-based warfare.15 Together with this, there has emerged the argument that large-scale war between states or coalitions of states, as opposed to varieties of unconventional warfare and failed states, are exceptional and potentially obsolete.16 The spread of WMD and ballistic missiles in Asia could overturn these expectations for the obsolescence or marginalization of major interstate warfare.

#### Extinction.

Krieger, ‘9

[David, Pres. Nuclear Age Peace Foundation and Councilor – World Future Council, “Still Loving the Bomb After All These Years”, 9-4, https://www.wagingpeace.org/articles/2009/09/04\_krieger\_newsweek\_response.php?krieger]

Jonathan Tepperman’s article in the September 7, 2009 issue of Newsweek, “Why Obama Should Learn to Love the Bomb,” provides a novel but frivolous argument that nuclear weapons “may not, in fact, make the world more dangerous….” Rather, in Tepperman’s world, “The bomb may actually make us safer.” Tepperman shares this world with Kenneth Waltz, a University of California professor emeritus of political science, who Tepperman describes as “the leading ‘nuclear optimist.’” Waltz expresses his optimism in this way: “We’ve now had 64 years of experience since Hiroshima. It’s striking and against all historical precedent that for that substantial period, there has not been any war among nuclear states.” Actually, there were a number of proxy wars between nuclear weapons states, such as those in Korea, Vietnam and Afghanistan, and some near disasters, the most notable being the 1962 Cuban Missile Crisis. Waltz’s logic is akin to observing a man falling from a high rise building, and noting that he had already fallen for 64 floors without anything bad happening to him, and concluding that so far it looked so good that others should try it. Dangerous logic! Tepperman builds upon Waltz’s logic, and concludes “that all states are rational,” even though their leaders may have a lot of bad qualities, including being “stupid, petty, venal, even evil….” He asks us to trust that rationality will always prevail when there is a risk of nuclear retaliation, because these weapons make “the costs of war obvious, inevitable, and unacceptable.” Actually, he is asking us to do more than trust in the rationality of leaders; he is asking us to gamble the future on this proposition. “The iron logic of deterrence and mutually assured destruction is so compelling,” Tepperman argues, “it’s led to what’s known as the nuclear peace….” But if this is a peace worthy of the name, which it isn’t, it certainly is not one on which to risk the future of civilization. One irrational leader with control over a nuclear arsenal could start a nuclear conflagration, resulting in a global Hiroshima. Tepperman celebrates “the iron logic of deterrence,” but deterrence is a theory that is far from rooted in “iron logic.” It is a theory based upon threats that must be effectively communicated and believed. Leaders of Country A with nuclear weapons must communicate to other countries (B, C, etc.) the conditions under which A will retaliate with nuclear weapons. The leaders of the other countries must understand and believe the threat from Country A will, in fact, be carried out. The longer that nuclear weapons are not used, the more other countries may come to believe that they can challenge Country A with impunity from nuclear retaliation. The more that Country A bullies other countries, the greater the incentive for these countries to develop their own nuclear arsenals. Deterrence is unstable and therefore precarious. Most of the countries in the world reject the argument, made most prominently by Kenneth Waltz, that the spread of nuclear weapons makes the world safer. These countries joined together in the Nuclear Non-Proliferation Treaty (NPT) to prevent the spread of nuclear weapons, but they never agreed to maintain indefinitely a system of nuclear apartheid in which some states possess nuclear weapons and others are prohibited from doing so. The principal bargain of the NPT requires the five NPT nuclear weapons states (US, Russia, UK, France and China) to engage in good faith negotiations for nuclear disarmament, and the International Court of Justice interpreted this to mean complete nuclear disarmament in all its aspects. Tepperman seems to be arguing that seeking to prevent the proliferation of nuclear weapons is bad policy, and that nuclear weapons, because of their threat, make efforts at non-proliferation unnecessary and even unwise. If some additional states, including Iran, developed nuclear arsenals, he concludes that wouldn’t be so bad “given the way that bombs tend to mellow behavior.” Those who oppose Tepperman’s favorable disposition toward the bomb, he refers to as “nuclear pessimists.” These would be the people, and I would certainly be one of them, who see nuclear weapons as presenting an urgent danger to our security, our species and our future. Tepperman finds that when viewed from his “nuclear optimist” perspective, “nuclear weapons start to seem a lot less frightening.” “Nuclear peace,” he tells us, “rests on a scary bargain: you accept a small chance that something extremely bad will happen in exchange for a much bigger chance that something very bad – conventional war – won’t happen.” But the “extremely bad” thing he asks us to accept is the end of the human species. Yes, that would be serious. He also doesn’t make the case that in a world without nuclear weapons, the prospects of conventional war would increase dramatically. After all, it is only an unproven supposition that nuclear weapons have prevented wars, or would do so in the future. We have certainly come far too close to the precipice of catastrophic nuclear war. As an ultimate celebration of the faulty logic of deterrence, Tepperman calls for providing any nuclear weapons state with a “survivable second strike option.” Thus, he not only favors nuclear weapons, but finds the security of these weapons to trump human security. Presumably he would have President Obama providing new and secure nuclear weapons to North Korea, Pakistan and any other nuclear weapons states that come along so that they will feel secure enough not to use their weapons in a first-strike attack. Do we really want to bet the human future that Kim Jong-Il and his successors are more rational than Mr. Tepperman?

#### Second – competitiveness

#### US is ceding nuclear competitiveness now – plan key to resolve

**Barton 11** [Charles Barton, Nuclear Green, “Have the Chinese Been Reading Energy from Thorium or Nuclear Green?” 1/31/11]

Last week the Chinese Academy of Science announced that it planned to finance the development of a Chinese Thorium Breeding Molten Salt Reactor (TMSR) or as it is called in the United States, the Liquid Fluoride Thorium Reactor (LFTR). The announcement came in a news report from Weihui.news365.com.cn. The announcement was relayed to Westerners who were interested in Thorium breeding molten salt reactors in a discussion thread comment posted by Chinese Scientist Hua Bai, last Friday. Kirk Sorensen, Brian Wang, and I all posted about Bai's announcement on Sunday, January 30.¶ In addition to these posts, the thread which Hua Bai started contains the revelation that the engineer who heads the Chinese Molten Salt Reactor Project is none other than Jiang Mianheng, a son of Retired Chinese President, Jiang Zemin. In addition to being President of People's China, Jiang was the chairmanship of the powerful Central Military Commission, suggesting the likelihood that Jiang Mianheng has military ties. He is the cofounder of Semiconductor Manufacturing International Corporation, and a former lead researcher in the Chinese Space Program, as well as Vice President of the Chinese Academy of Sciences. The presence of such a well connected Chinese science leader suggests that the Chinese TMSR project is regarded as important by the Chinese leadership. Thus the Chinese leadership, unlike the American Political andscientific leadership has grasped the potential of molten salt nuclear technology.¶ Yesterday, "horos11" commented on my blog, Nuclear Green,¶ I read this, and I didn't know whether to laugh or cry.¶ After all, this site and others have been sounding the clarion call to action on this, and I should be glad that someone finally heeded it and its getting traction in a place that really matters, but I have a sinking feeling that:¶ a. its going to take far less than their planned 20 years¶ b. they are going to succeed beyond their wildest expectations.¶ Which means that the next, giant sucking sound we may hear is the sound of the 5 trillion dollar energy market heading east, further depressing our economy, weakening the dollar (and the euro) and ultimately making the US economy dependent on rescue from the chinese in the future (when they are done rescuing themselves).¶ Yet, in the large scheme of things, this is a definite good, and may be our savior from anthropomorphic climate change.¶ so again, laugh? or cry. I guess its up to how you view things - I guess I'm tentatively laughing at the moment, but mostly from the overwhelming irony of all this.¶ Jason Ribeiro added,¶ I can't help but have a feeling of sour grapes about this. While I congratulate China for doing the obvious, America has its head buried so far in the sand it can't see straight. With all the internet clamor about LFTR that's been going on the internet in the past 3-4 years, it was the non-English speaking Chinese that finally got the message that this was a great idea worth investing in. Our leadership ought to be ashamed of themselves.¶ The Chinese News story on the Thorium Molten Salt Reactor reflects the clear Chinese thinking about the potential role of LFTRs in the future Chinese energy economy. I will paraphrase,¶ "the future of advanced nuclear fission energy - nuclear energy, thorium-based molten salt reactor system" project was officially launched. . . The scientific goal is to developed a new generation of nuclear energy systems [and to achieve commercial] use [in] 20 years or so. We intend to complete the technological research needed for this system and to assert intellectual property rights to this technology. Fossil fuel energy is being depleted, and solar and wind energy are not stable enough, while hydropower development has reached the limit of its potential.. . .¶ Nuclear power seems to offer us a very attractive future energy choice, high energy density, low carbon emissions, and the potential for sustainable development. . . . China has chosen {to make an energy] breakthrough in the direction of molten salt reactors. . . . this liquid fuel reactors has a simple structure and can run at atmospheric pressure, [it can use any fissionable material as fuel} and has other advantages. "This new stove" can be made very small, will operate with stabile nuclear fuel, and will run for several decades before replacement. After the thorium is completely used in the nuclear process the TMSR will produce nuclear waste will be only be one-thousandth of that produced by existing nuclear technologies.¶ As the world is still in the development of a new generation of nuclear reactors, the thorium-based independent research and development of molten salt reactors, will be possible to obtain all intellectual property rights. This will enable China to firmly grasp the lifeline of energy in their own hands.¶ Let the word "nuclear" no longer mean war.¶ In the past, people always talk about "core" colors. The Hiroshima atomic bomb, the Chernobyl nuclear power plant explosion, these are like a lingering nightmare that is marked in human history. But a new generation of nuclear power will take the color green, the mark of peace taking human beings into a new era.¶ Oh Wow! It sounds as if someone in China has been reading Nuclear Green or Energy from Thorium. And there is more!¶ In addition, the "new stove" operating at atmospheric pressure operation, rather than the traditional reactor operating at high pressure, will be simple and safe. "When the furnace temperature exceeds a predetermined value, in the bottom of the MSR core, a frozen plug of salt will automatically melt, releasing the liquid salt in the reactor core into an emergency storage tanks, and terminating the nuclear reaction," scientist Xu Hongjie told reporters, as the cooling agent is fluoride salts (the same salts that also carrying the nuclear fuel), after the liquid salt cools it turns solid, which prevents the nuclear fuel from leaking out of its containment, and thus will not pollute ground water causing an ecological disasters. The added safety opens up new possibilities for reactors, they can be built underground, completely isolating radioactive materials from the reactor, also the underground location will protect the reactor from an enemy's weapon attack. Reactors can be built in large cities, in the wilderness, or in remote villages.¶ Well Kirk Sorensen and I wanted our ideas to become national priorities. We just did not know in what country it would happen first. Unfortunately the leadership of the United States, continues to be determined to lead this nation into the wilderness of powerlessness, while the leadership of communist China is alert to the possibilities of a new energy age. Possibilities that can be realized by molten salt nuclear technology. Lets hope that someone in the White House or Congress wakes up. The Chinese understand the implications of their venture into Molten Salt nuclear technology. The American leadership does not.

#### Ceding nuclear leadership creates an energy disadvantage vis a vi other countries, destroys perception of competitiveness

**Barton 10** (Charles Barton, Nuclear Green "Keeping up with China: The Economic Advantage of Molten Salt Nuclear Technology," 12/1/10)

American and European nuclear development can either proceed by following the cost lowering paths being pioneered in Asia, or begin to develop low cost innovative nuclear plans. Since low labor costs, represent the most significant Chinese and Indian cost advantage, it is unlikely that European and American reactor manufacturers will be able to compete with the Asians on labor costs. Labor costs for conventional reactors can be lowered by factory construction of reactor componant moduels, but the Chinese are clearly ahead of the West in that game. Yet the weakness of the Chinese system is the relatively large amount of field labor that the manufacture of large reactors requires.¶ The Chines system is to introduce labor saving devices where ever and when ever possible, but clearly shifting labor from the field to a factory still offers cost advantages. The more labor which can be performed in the factory, the more labor cost savings are possible. Other savings advantages are possible by simplifying reactor design, and lowering materials input. Building a reactor with less materials and fewer parts lowers nuclear costs directly and indirectly. Decreasing core size per unit of power output also can contribute a cost advantage. Direct saving relate to the cost of parts and matetials, but fewer parts and less material also means less labor is required to put things together, since there is less to put together. In addition a small reactor core structure, would, all other things being equal, require a smaller housing. Larger cores mean more structural housing expenses.¶ While the Pebel Bed Modular Reactor has a relatively simple core design, the actual core is quite large, because of the cooling inefficiency of helium. Thus, the simplisity of the PBMR core is ballanced by its size, its total materials input, and the size of its housing. The large core and housing requirements of the PBMR also adds to its labor costs, especially its field labor cost. Thus while the simplisity of the PBMR core design would seem to suggest a low cost, this expectation is unlikely to br born out in practice.¶ Transportation limits ability to shift production from the field to the factory. An analysis preformed by the University of Tennessee's, and the Massachusettes Institute of Technology's Departments of Nuclear Engineering looked at the 335 MW Westinghouse IRIS reactor. The analysis found,¶ A rough estimate of the weight for a 1000 MWt modular reactor and its secondary system, similar to the Westinghouse IRIS plant, is taken as the summation of all of the major components in the analysis. Many of the smaller subcomponents have been neglected. The containment structure contributes ~2.81E6 kg (3100 tons). The primary reactor vessel and the turbo-generator contribute ~1.45E6 kg (1600 tons) each. The heat exchange equipment and piping contribute ~6.78E5 kg (747 tons). Therefore, the total weight of the major plant components is~ 6.39E6 kg (7047 tons).¶ The weight and width of the IRIS would place constraints of barge transportation of the IRIS on the Tennessee and Ohio Rivers. The report stated,¶ The Westinghouse barge mounted IRIS reactor modules were limited in size based on input from the University of Tennessee. The barge dimension limitations were established to be 30 meters (98’-5”) wide, 100 meters (328’-1”) long, with a 2.74 meter (9’) draft. These dimensions establish the barge maximum displacement at 8,220 metric tons. In addition, the barge(s) are limited to ~20 meters (65’-7”) in height above the water surface, so that they fit under crossing bridges and can be floated up the Mississippi, Ohio, and Tennessee Rivers as far as the city of Chattanooga, Tennessee. Further movement above Chattanooga is currently limited by the locks at the Chickamauga Reservoir dam.¶ The above barge displacement limitation will impose severe limits on how much structural support and shield concrete can be placed in the barge modules at the shipyard. For example, the estimated weight of concrete in the IRIS containment and the surrounding cylindrical shield structure alone greatly exceeds the total allowable barge displacement. This however does not mean that barge- mounted pressurized water reactors (PWRs) are not feasible. It does mean that barge-mounted PWRs need to employ steel structures that are then used as the forms for the addition of needed concrete after the barge has been floated into its final location and founded.¶ Thus for the IRIS, barge transportation presented problems, and rail transportation was unthinkable. The core of the 125 MW B&W mPower reactor is rail transportable, but final onsite mPower assembly/construction became a significant undertaking, with a consequent increase in overall cost. The core unit does include a pressure vessel and heat exchange mounted above the actual reactor, but many other mPower component modules must be transported seperately and assembled on site.¶ The IIRIS project demonstrates the unlikelihood of whole small reactors being transported to the field ready for energy production without some field construction. This might be possible, however, for mini reactors that are two small to be viewed as a plausible substitute for the fossil fuel powered electrical plants currently supplying electricity for the grid. This then leaves us with¶ with a gap between the cost savings potential of factory manufacture, and the costly process of onsite assembly. B&W the manufacturers of the small 125 MW MPower reactor still has not clarified what percentage of the manufacturing process would be factory based. It is clear, however that B&W knows where it is comming from and what its problems are, as Rod Adams tells us:¶ I spoke in more detail to Chris Mowry and listened as he explained how his company's research on the history of the nuclear enterprise in the US had revealed that 30% of the material and labor cost of the existing units came from the supplied components while 70% was related to the site construction effort. He described how the preponderance of site work had influenced the cost uncertainty that has helped to discourage new nuclear plant construction for so many years.¶ What Mowey did not tell Adams is what percentage of the materials and labor costs will be shifted to the factory as mPower reactors are produced. There have been hints that a significant percentage of the mPower manufacturing process, perhaps as much as 50% will still take place on site. B&W still is working on the design of their manufacturing process, and thus do not yet know all of the details. Clearly then more work needs to be done on controlling onsite costs.¶ Finally, a shift to advanced technology will can lower manufacturing costs. Compared to Light Water reactors, Liquid metal cooled reactors use less material and perhaps less labor, but pool type liqiod metal reactors are not compact. Compared to Liquid Metal cooled reactors, Molten Salt cooled reactor will have more compact cores. Shifting to closed cycle gas turbines will decrease construction costs. The added safety of Molten Salt cooled reactors will increase reactor simplification, and thus further lower labor and materials related construction costs.¶ The recycling of old power plant locations will also offer some savings. Decreasing manufacturing time will lower interest costs. ¶ All in all there are a lot of reasons to expect lower nuclear manufacturing costs with Generation IV nuclear power plants, and at present no one has come up with a good reason for expecting Molten Salt cooled reactors to cost more than traditional NPPs. The argument, however, is not iron clad. Even if no one has pointed out plasuible errors in it, we need to introduce the caviot that expectations frenquently are not meet. It is possible, for example that the NRC might impose unreasonable expectations on molten salt cooled reactors. Demanding, for example, that they include the same safety features as LWRs, even though they do not have many LWR safety problems. But the potential savings on the cost of energy by adopting molten salt nuclear technology is substantial, and should not be ignored. ¶ To return to the problem posed by Brian Wang, the problem of lower Asian nuclear construction costs. If Europe and the United States cannot meet the Asican energy cost challenge, their economies will encounter a significant decline. Because of Labor cost advantages, it is unlikely that Generation III nuclear plants will ever cost less to build in the United States or Europe than in Asia. in order to keep the American and European economies competitive, the United States and Europe must adopt a low cost, factory manufactured nuclear technology. Molten Salt nuclear technology represents the lowest cost approach, and is highly consistent with factory manufacture and other cost lowering approaches. Couple to that the outstanding safety of molten salt nuclear technology, the potential for dramatically lowering the creation of nuclear waste, and the obsticles to nuclear proliferation posed by molten salt nuclear rechnology, and we see a real potential for keeping the American and European economies competitive, at least as far as energy costs are concerned.

#### That prevents great power wars – perception is key

**Baru 9** - Visiting Professor at the Lee Kuan Yew School of Public Policy in Singapore (Sanjaya, “Year of the power shift?,”

http://www.india-seminar.com/2009/593/593\_sanjaya\_baru.htm

**T**here is no doubt that economics alone will not determine the balance of global power, but there is no doubt either that economics has come to matter for more.¶ The management of the economy, and of the treasury, has been a vital aspect of statecraft from time immemorial. Kautilya’s *Arthashastra* says, ‘From the strength of the treasury the army is born. …men without wealth do not attain their objectives even after hundreds of trials… Only through wealth can material gains be acquired, as elephants (wild) can be captured only by elephants (tamed)… A state with depleted resources, even if acquired, becomes only a liability.’4 Hence, economic policies and performance do have strategic consequences.5¶ In the modern era, the idea that strong economic performance is the foundation of power was argued most persuasively by historian Paul Kennedy. ‘Victory (in war),’ Kennedy claimed, ‘has repeatedly gone to the side with more flourishing productive base.’6 Drawing attention to the interrelationships between economic wealth, technological innovation, and the ability of states to efficiently mobilize economic and technological resources for power projection and national defence, Kennedy argued that nations that were able to better combine military and economic strength scored over others.¶ ‘The fact remains,’ Kennedy argued, ‘that all of the major shifts in the world’s *military-power* balance have followed alterations in the *productive* balances; and further, that the rising and falling of the various empires and states in the international system has been confirmed by the outcomes of the major Great Power wars, where victory has always gone to the side with the greatest material resources.’7¶ **I**n Kennedy’s view the geopolitical consequences of an economic crisis or even decline would be transmitted through a nation’s inability to find adequate financial resources to simultaneously sustain economic growth and military power – the classic ‘guns vs butter’ dilemma.¶ Apart from such fiscal disempowerment of the state, economic under-performance would also reduce a nation’s attraction as a market, a source of capital and technology, and as a ‘knowledge power’. As power shifted from Europe to America, so did the knowledge base of the global economy. As China’s power rises, so does its profile as a ‘knowledge economy’.¶ Impressed by such arguments the China Academy of Social Sciences developed the concept of Comprehensive National Power (CNP) to get China’s political and military leadership to focus more clearly on economic and technological performance than on military power alone in its quest for Great Power status.8¶ While China’s impressive economic performance and the consequent rise in China’s global profile has forced strategic analysts to acknowledge this link, the recovery of the US economy in the 1990s had reduced the appeal of the Kennedy thesis in Washington DC. We must expect a revival of interest in Kennedy’s arguments in the current context.¶ **A** historian of power who took Kennedy seriously, Niall Ferguson, has helped keep the focus on the geopolitical implications of economic performance. In his masterly survey of the role of finance in the projection of state power, Ferguson defines the ‘square of power’ as the tax bureaucracy, the parliament, the national debt and the central bank. These four institutions of ‘fiscal empowerment’ of the state enable nations to project power by mobilizing and deploying financial resources to that end.9 ¶ Ferguson shows how vital sound economic management is to strategic policy and national power. More recently, Ferguson has been drawing a parallel between the role of debt and financial crises in the decline of the Ottoman and Soviet empires and that of the United States of America. In an early comment on the present financial crisis, Ferguson wrote:¶ ‘We are indeed living through a global shift in the balance of power very similar to that which occurred in the 1870s. This is the story of how an over-extended empire sought to cope with an external debt crisis by selling off revenue streams to foreign investors. The empire that suffered these setbacks in the 1870s was the Ottoman empire. Today it is the US… It remains to be seen how quickly today’s financial shift will be followed by a comparable geopolitical shift in favour of the new export and energy empires of the east. Suffice to say that the historical analogy does not bode well for America’s quasi-imperial network of bases and allies across the Middle East and Asia. Debtor empires sooner or later have to do more than just sell shares to satisfy their creditors*. …*as in the 1870s the balance of financial power is shifting. Then, the move was from the ancient Oriental empires (not only the Ottoman but also the Persian and Chinese) to Western Europe. Today the shift is from the US – and other western financial centres – to the autocracies of the Middle East and East Asia.’10 ¶ An economic or financial crisis may not trigger the decline of an empire. It can certainly speed up a process already underway. In the case of the Soviet Union the financial crunch caused by the Afghan war came on top of years of economic under-performance and the loss of political legitimacy of the Soviet state. In a democratic society like the United States the political legitimacy of the state is constantly renewed through periodic elections. Thus, the election of Barack Obama may serve to renew the legitimacy of the state and by doing so enable the state to undertake measures that restore health to the economy. This the Soviet state was unable to do under Gorbachev even though he repudiated the Brezhnev legacy and distanced himself from it.¶ Hence, one must not become an economic determinist and historic parallels need not always be relevant. Politics can intervene and offer solutions. Political economy and politics, in the form of Keynesian economics and the ‘New Deal’, did intervene to influence the geopolitical implications of the Great Depression. Whether they will do so once again in today’s America remains to be seen.

#### Independently key to heg

Gelb, 10 - currently president emeritus of the Council on Foreign Relations, (Leslie, Fashioning a Realistic Strategy for the Twenty-First Century,” Fletcher Forum of World Affairs vol.34:2 summer 2010 http://fletcher.tufts.edu/forum/archives/pdfs/34-2pdfs/Gelb.pdf)

**LESLIE H. GELB:** Power is what it always has been. It is the ability to get someone to do something they do not want to do by means of your resources and your position. It was always that. There is no such thing in my mind as “soft” power or “hard” power or “smart” power or “dumb” power. It is people who are hard or soft or smart or dumb. Power is power. And people use it wisely or poorly. Now, what has changed is the composition of power in international affairs. For almost all of history, international power was achieved in the form of military power and military force. Now, particularly in the last fifty years or so, it has become more and more economic. So power consists of economic power, military power, and diplomatic power, but the emphasis has shifted from military power (for almost all of history) to now, more economic power. And, as President Obama said in his West Point speech several months ago, our economy is the basis of our international power in general and our military power in particular. That is where it all comes from. Whether other states listen to us and act on what we say depends a good deal on their perception of the strength of the American economy. A big problem for us in the last few years has been the perception that our economy is in decline.

#### Heg solves extinction

**Barnett 2011** – Former Senior Strategic Researcher and Professor in the Warfare Analysis & Research Department, Center for Naval Warfare Studies, U.S. Naval War College, worked as the Assistant for Strategic Futures in the Office of Force Transformation in the DOD (3/7, Thomas, World Politics Review, “The New Rules: Leadership Fatigue Puts U.S., and Globalization, at Crossroads”, <http://www.worldpoliticsreview.com/articles/8099/the-new-rules-leadership-fatigue-puts-u-s-and-globalization-at-crossroads>, credit to LDK)

Events in Libya are a further reminder for Americans that we stand at a crossroads in our continuing evolution as the world's sole full-service superpower. Unfortunately, we are increasingly seeking change without cost, and shirking from risk because we are tired of the responsibility. We don't know who we are anymore, and our president is a big part of that problem. Instead of leading us, he explains to us. Barack Obama would have us believe that he is practicing strategic patience. But many experts and ordinary citizens alike have concluded that he is actually beset by strategic incoherence -- in effect, a man overmatched by the job.  It is worth first examining the larger picture: We live in a time of arguably the greatest structural change in the global order yet endured, with this historical moment's most amazing feature being its relative and absolute lack of mass violence. That is something to consider when Americans contemplate military intervention in Libya, because if we do take the step to prevent larger-scale killing by engaging in some killing of our own, we will not be adding to some fantastically imagined global death count stemming from the ongoing "megalomania" and "evil" of American "empire." We'll be engaging in the same sort of system-administering activity that has marked our stunningly successful stewardship of global order since World War II.  Let me be more blunt: As the guardian of globalization, the U.S. military has been the greatest force for peace the world has ever known. Had America been removed from the global dynamics that governed the 20th century, the mass murder never would have ended. Indeed, it's entirely conceivable there would now be no identifiable human civilization left, once nuclear weapons entered the killing equation.  But the world did not keep sliding down that path of perpetual war. Instead, America stepped up and changed everything by ushering in our now-perpetual great-power peace. We introduced the international liberal trade order known as globalization and played loyal Leviathan over its spread. What resulted was the collapse of empires, an explosion of democracy, the persistent spread of human rights, the liberation of women, the doubling of life expectancy, a roughly 10-fold increase in adjusted global GDP and a profound and persistent reduction in battle deaths from state-based conflicts.

#### Third, Terrorism – spent nuclear fuel is exposed in the status quo – fast reactors solve

**NTI 12** [Nuclear Threat Initiative, 8-1-2012, "Why Is Highly Enriched Uranium a Threat?" Prepared by the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies]

The most difficult challenge for a terrorist organization seeking to build a nuclear weapon or improvised nuclear device is obtaining fissile material, either plutonium or highly enriched uranium (HEU). HEU, uranium that has been processed to increase the proportion of the U-235 isotope to over 20%, is required for the construction of a gun-type nuclear device, the simplest type of nuclear weapon. The greater the proportion of U-235 (i.e. the higher the enrichment level), the less material is needed for a nuclear explosive device. Weapons-grade uranium generally refers to uranium enriched to at least 90%, but material of far lower enrichment levels, found in both fresh and spent nuclear fuel, can be used to create a nuclear explosive device.¶ In 2002, the U.S. National Research Council warned that "crude HEU weapons could be fabricated without state assistance," noting that "the primary impediment that prevents countries or technically competent terrorist groups from developing nuclear weapons is the availability of [nuclear material], especially HEU."[1] Creating a nuclear weapon from HEU is technically easier than building a plutonium weapon. Moreover, current technology is unlikely to detect a shielded nuclear device on a truck or boat. Therefore, securing and eliminating stocks of HEU is the surest way to decrease the risk that terrorist groups could use this material to create a nuclear explosion.¶ Where Is Civilian HEU Located?¶ Experts estimate that approximately 70 tons of HEU are used in civilian applications worldwide. [2] As little as 25 kilograms (kg) of U-235 (which amounts to about 28kg of HEU enriched to 90%) is needed to produce a nuclear weapon; about 40-60kg is needed for a cruder nuclear device. [3] Bomb-grade material can be obtained from HEU that is fresh (unirradiated), and irradiated (also referred to as spent). Fresh and lightly irradiated fuel (such as fuel used in critical assemblies and pulse reactors) is not significantly radioactive, and is therefore relatively safe to handle. Although using nuclear fuel in high-powered reactors initially makes it highly radioactive and thus very difficult to handle safely (often this fuel is referred to as "self-protecting"), spent fuel loses its radioactivity over time, making it easier to handle and potentially more attractive to terrorists.¶ HEU is currently used in the civilian sphere to fuel research reactors, critical assemblies, pulsed reactors, and a few fast reactors. According to the International Atomic Energy Agency (IAEA), 244 research reactors are in operation or temporarily shut down across 56 countries. A further 441 reactors have been shut down or decommissioned, while eight are planned or under construction. [4]

#### That’s key to the nuclear taboo – solves nuclear war

Bin ‘9(5-22-09 About the Authors Prof. Li Bin is a leading Chinese expert on arms control and is currently the director of Arms Control Program at the Institute of International Studies, Tsinghua University. He received his Bachelor and Master Degrees in Physics from Peking University before joining China Academy of Engineering Physics (CAEP) to pursue a doctorate in the technical aspects of arms control. He served as a part-time assistant on arms control for the Committee of Science, Technology and Industry for National Defense (COSTIND).Upon graduation Dr. Li entered the Institute of Applied Physics and Computational Mathematics (IAPCM) as a research fellow and joined the COSTIND technical group supporting Chinese negotiation team on Comprehensive Test Ban Treaty (CTBT). He attended the final round of CTBT negotiations as a technical advisor to the Chinese negotiating team. Nie Hongyi is an officer in the People’s Liberation Army with an MA from China’s National Defense University and a Ph.D. in International Studies from Tsinghua University, which he completed in 2009 under Prof. Li Bin. )

The nuclear taboo is a kind of international norm and this type of norm is supported by the promotion of the norm through international social exchange. But at present the increased **threat of nuclear terrorism has lowered people’s confidence that nuclear weapons will not be used**. China and the United States have a broad common interest in combating nuclear terrorism. **Using technical and institutional measures to break the foundation of nuclear terrorism and lessen the possibility of a nuclear terrorist attack can** not only weaken the danger of nuclear terrorism itself but also **strengthen people’s confidence in the nuclear taboo**, and in this way preserve an international environment beneficial to both China and the United States. In this way **even if there is crisis** in China-U.S. relations caused by conflict, **the nuclear taboo can** also help both countries **reduce suspicions** about the nuclear weapons problem, **avoid miscalculation and thereby reduce the danger of a nuclear war.**

### Warming

#### Warming is real and anthropogenic – carbon dioxide increase, polar ice records, melting glaciers, sea level rise

**Prothero 12** [Donald R. Prothero, Professor of Geology at Occidental College and Lecturer in Geobiology at the California Institute of Technology, 3-1-2012, "How We Know Global Warming is Real and Human Caused," Skeptic, vol 17 no 2, EBSCO]

Converging Lines of Evidence¶ How do we know that global warming is real and primarily human caused? There are numerous lines of evidence that converge toward this conclusion.¶ 1. Carbon Dioxide Increase.¶ Carbon dioxide in our atmosphere has increased at an unprecedented rate in the past 200 years. Not one data set collected over a long enough span of time shows otherwise. Mann et al. (1999) compiled the past 900 years' worth of temperature data from tree rings, ice cores, corals, and direct measurements in the past few centuries, and the sudden increase of temperature of the past century stands out like a sore thumb. This famous graph is now known as the "hockey stick" because it is long and straight through most of its length, then bends sharply upward at the end like the blade of a hockey stick. Other graphs show that climate was very stable within a narrow range of variation through the past 1000, 2000, or even 10,000 years since the end of the last Ice Age. There were minor warming events during the Climatic Optimum about 7000 years ago, the Medieval Warm Period, and the slight cooling of the Little Ice Age in die 1700s and 1800s. But the magnitude and rapidity of the warming represented by the last 200 years is simply unmatched in all of human history. More revealing, die timing of this warming coincides with the Industrial Revolution, when humans first began massive deforestation and released carbon dioxide into the atmosphere by burning an unprecedented amount of coal, gas, and oil.¶ 2. Melting Polar Ice Caps.¶ The polar icecaps are thinning and breaking up at an alarming rate. In 2000, my former graduate advisor Malcolm McKenna was one of the first humans to fly over the North Pole in summer time and see no ice, just open water. The Arctic ice cap has been frozen solid for at least the past 3 million years (and maybe longer),4 but now the entire ice sheet is breaking up so fast that by 2030 (and possibly sooner) less than half of the Arctic will be ice covered in the summer.5 As one can see from watching the news, this is an ecological disaster for everything that lives up there, from the polar bears to the seals and walruses to the animals they feed upon, to the 4 million people whose world is melting beneath their feet. The Antarctic is thawing even faster. In February-March 2002, the Larsen B ice shelf - over 3000 square km (the size of Rhode Island) and 220 m (700 feet) thick- broke up in just a few months, a story typical of nearly all the ice shelves in Antarctica. The Larsen B shelf had survived all the previous ice ages and interglacial warming episodes over the past 3 million years, and even the warmest periods of the last 10,000 years- yet it and nearly all the other thick ice sheets on the Arctic, Greenland, and Antarctic are vanishing at a rate never before seen in geologic history.¶ 3. Melting Glaciers.¶ Glaciers are all retreating at the highest rates ever documented. Many of those glaciers, along with snow melt, especially in the Himalayas, Andes, Alps, and Sierras, provide most of the freshwater that the populations below the mountains depend upon - yet this fresh water supply is vanishing. Just think about the percentage of world's population in southern Asia (especially India) that depend on Himalayan snowmelt for their fresh water. The implications are staggering. The permafrost that once remained solidly frozen even in the summer has now Üiawed, damaging the Inuit villages on the Arctic coast and threatening all our pipelines to die North Slope of Alaska. This is catastrophic not only for life on the permafrost, but as it thaws, the permafrost releases huge amounts of greenhouse gases which are one of the major contributors to global warming. Not only is the ice vanishing, but we have seen record heat waves over and over again, killing thousands of people, as each year joins the list of the hottest years on record. (2010 just topped that list as the hottest year, surpassing the previous record in 2009, and we shall know about 2011 soon enough). Natural animal and plant populations are being devastated all over the globe as their environments change.6 Many animals respond by moving their ranges to formerly cold climates, so now places that once did not have to worry about disease-bearing mosquitoes are infested as the climate warms and allows them to breed further north.¶ 4. Sea Level Rise.¶ All that melted ice eventually ends up in the ocean, causing sea levels to rise, as it has many times in the geologic past. At present, the sea level is rising about 3-4 mm per year, more than ten times the rate of 0.10.2 mm/year that has occurred over the past 3000 years. Geological data show Üiat ttie sea level was virtually unchanged over the past 10,000 years since the present interglacial began. A few mm here or there doesn't impress people, until you consider that the rate is accelerating and that most scientists predict sea levels will rise 80-130 cm in just the next century. A sea level rise of 1.3 m (almost 4 feet) would drown many of the world's low-elevation cities, such as Venice and New Orleans, and low-lying countries such as the Netherlands or Bangladesh. A number of tiny island nations such as Vanuatu and the Maldives, which barely poke out above the ocean now, are already vanishing beneath the waves. Eventually their entire population will have to move someplace else.7 Even a small sea level rise might not drown all these areas, but they are much more vulnerable to the large waves of a storm surge (as happened with Hurricane Katrina), which could do much more damage than sea level rise alone. If sea level rose by 6 m (20 feet), most of die world's coastal plains and low-lying areas (such as the Louisiana bayous, Florida, and most of the world's river deltas) would be drowned.¶ Most of the world's population lives in lowelevation coastal cities such as New York, Boston, Philadelphia, Baltimore, Washington, D.C., Miami, and Shanghai. All of those cities would be partially or completely under water with such a sea level rise. If all the glacial ice caps melted completely (as they have several times before during past greenhouse episodes in the geologic past), sea level would rise by 65 m (215 feet)! The entire Mississippi Valley would flood, so you could dock an ocean liner in Cairo, Illinois. Such a sea level rise would drown nearly every coastal region under hundreds of feet of water, and inundate New York City, London and Paris. All that would remain would be the tall landmarks such as the Empire State Building, Big Ben, and the Eiffel Tower. You could tie your boats to these pinnacles, but the rest of these drowned cities would lie deep underwater.

#### Warming causes nuclear war

Campbell et al 2007 [Kurt, “The Age of Consequences: The Foreign Policy and National Security Implications of Global Climate Change,” CSIS, November, p. 3, <http://www.csis.org/media/csis/pubs/071105_ageofconsequences.pdf>]

In the case of severe climate change, corresponding to an average increase in global temperature of 2.6°C by 2040, massive non-linear events in the global environment give rise to massive nonlinear societal events. In this scenario, addressed in Chapter IV, nations around the world will be overwhelmed by the scale of change and pernicious challenges, such as pandemic disease. The internal cohesion of nations will be under great stress, including in the United States, both as a result of a dramatic rise in migration and changes in agricultural patterns and water availability. The flooding of coastal communities around the world, especially in the Netherlands, the United States, South Asia, and China, has the potential to challenge regional and even national identities. Armed conflict between nations over resources, such as the Nile and its tributaries, is likely and nuclear war is possible. The social consequences range from increased religious fervor to outright chaos. In this scenario, climate change provokes a permanent shift in the relationship of humankind to nature.

#### Warming causes extinction – oceans

**Sify 2010 –** Sydney newspaper citing Ove Hoegh-Guldberg, professor at University of Queensland and Director of the Global Change Institute, and John Bruno, associate professor of Marine Science at UNC (Sify News, “Could unbridled climate changes lead to human extinction?”, <http://www.sify.com/news/could-unbridled-climate-changes-lead-to-human-extinction-news-international-kgtrOhdaahc.html>, WEA)

The findings of the comprehensive report: 'The impact of climate change on the world's marine ecosystems' emerged from a synthesis of recent research on the world's oceans, carried out by two of the world's leading marine scientists. One of the authors of the report is Ove Hoegh-Guldberg, professor at The University of Queensland and the director of its Global Change Institute (GCI). 'We may see sudden, unexpected changes that have serious ramifications for the overall well-being of humans, including the capacity of the planet to support people. This is further evidence that we are well on the way to the next great extinction event,' says Hoegh-Guldberg. 'The findings have enormous implications for mankind, particularly if the trend continues. The earth's ocean, which produces half of the oxygen we breathe and absorbs 30 per cent of human-generated carbon dioxide, is equivalent to its heart and lungs. This study shows worrying signs of ill-health. It's as if the earth has been smoking two packs of cigarettes a day!,' he added. 'We are entering a period in which the ocean services upon which humanity depends are undergoing massive change and in some cases beginning to fail', he added. The 'fundamental and comprehensive' changes to marine life identified in the report include rapidly warming and acidifying oceans, changes in water circulation and expansion of dead zones within the ocean depths. These are driving major changes in marine ecosystems: less abundant coral reefs, sea grasses and mangroves (important fish nurseries); fewer, smaller fish; a breakdown in food chains; changes in the distribution of marine life; and more frequent diseases and pests among marine organisms. Study co-author John F Bruno, associate professor in marine science at The University of North Carolina, says greenhouse gas emissions are modifying many physical and geochemical aspects of the planet's oceans, in ways 'unprecedented in nearly a million years'. 'This is causing fundamental and comprehensive changes to the way marine ecosystems function,' Bruno warned, according to a GCI release. These findings were published in Science

#### The IFR is the only way to reduce coal emissions sufficiently to avert the worst climate disasters

**Kirsch 9** (Steve Kirsch, Bachelor of Science and a Master of Science in electrical engineering and computer science from the Massachusetts Institute of Technology, American serial entrepreneur who has started six companies: Mouse Systems, Frame Technology, Infoseek, Propel, Abaca, and OneID, "Why We Should Build an Integral Fast Reactor Now," 11/25/9) http://skirsch.wordpress.com/2009/11/25/ifr/

To prevent a climate disaster, we must eliminate virtually all coal plant emissions worldwide in 25 years. The best way and, for all practical purposes, the only way to get all countries off of coal is not with coercion; it is to make them want to replace their coal burners by giving them a plug-compatible technology that is less expensive. The IFR can do this. It is plug-compatible with the burners in a coal plant (see Nuclear Power: Going Fast). No other technology can upgrade a coal plant so it is greenhouse gas free while reducing operating costs at the same time. In fact, no other technology can achieve either of these goals. The IFR can achieve both.¶ The bottom line is that without the IFR (or a yet-to-be-invented technology with similar ability to replace the coal burner with a cheaper alternative), it is unlikely that we’ll be able to keep CO2 under 450 ppm.¶ Today, the IFR is the only technology with the potential to displace the coal burner. That is why restarting the IFR is so critical and why Jim Hansen has listed it as one of the top five things we must do to avert a climate disaster.[4]¶ Without eliminating virtually all coal emissions by 2030, the sum total of all of our other climate mitigation efforts will be inconsequential. Hansen often refers to the near complete phase-out of carbon emissions from coal plants worldwide by 2030 as the sine qua non for climate stabilization (see for example, the top of page 6 in his August 4, 2008 trip report).¶ To stay under 450ppm, we would have to install about 13,000 GWe of new carbon-free power over the next 25 years. That number was calculated by Nathan Lewis of Caltech for the Atlantic, but others such as Saul Griffith have independently derived a very similar number and White House Science Advisor John Holdren used 5,600 GWe to 7,200 GWe in his presentation to the Energy Bar Association Annual Meeting on April 23, 2009. That means that if we want to save the planet, we must install more than 1 GWe per day of clean power every single day for the next 25 years. That is a very, very tough goal. It is equivalent to building one large nuclear reactor per day, or 1,500 huge wind turbines per day, or 80,000 37 foot diameter solar dishes covering 100 square miles every day, or some linear combination of these or other carbon free power generation technologies. Note that the required rate is actually higher than this because Hansen and Rajendra Pachauri, the chair of the IPCC, now both agree that 350ppm is a more realistic “not to exceed” number (and we’ve already exceeded it).¶ Today, we are nowhere close to that installation rate with renewables alone. For example, in 2008, the average power delivered by solar worldwide was only 2 GWe (which is to be distinguished from the peak solar capacity of 13.4GWe). That is why every renewable expert at the 2009 Aspen Institute Environment Forum agreed that nuclear must be part of the solution. Al Gore also acknowledges that nuclear must play an important role.¶ Nuclear has always been the world’s largest source of carbon free power. In the US, for example, even though we haven’t built a new nuclear plant in the US for 30 years, nuclear still supplies 70% of our clean power!¶ Nuclear can be installed very rapidly; much more rapidly than renewables. For example, about two thirds of the currently operating 440 reactors around the world came online during a 10 year period between 1980 and 1990. So our best chance of meeting the required installation of new power goal and saving the planet is with an aggressive nuclear program.¶ Unlike renewables, nuclear generates base load power, reliably, regardless of weather. Nuclear also uses very little land area. It does not require the installation of new power lines since it can be installed where the power is needed. However, even with a very aggressive plan involving nuclear, it will still be extremely difficult to install clean power fast enough.¶ Unfortunately, even in the US, we have no plan to install the clean power we need fast enough to save the planet. Even if every country were to agree tomorrow to completely eliminate their coal plant emissions by 2030, how do we think they are actually going to achieve that? There is no White House plan that explains this. There is no DOE plan. There is no plan or strategy. The deadlines will come and go and most countries will profusely apologize for not meeting their goals, just like we have with most of the signers of the Kyoto Protocol today. Apologies are nice, but they will not restore the environment.¶ We need a strategy that is believable, practical, and affordable for countries to adopt. The IFR offers our best hope of being a centerpiece in such a strategy because it the only technology we know of that can provide an economically compelling reason to change.¶ At a speech at MIT on October 23, 2009, President Obama said “And that’s why the world is now engaged in a peaceful competition to determine the technologies that will power the 21st century. … The nation that wins this competition will be the nation that leads the global economy. I am convinced of that. And I want America to be that nation, it’s that simple.”¶ Nuclear is our best clean power technology and the IFR is our best nuclear technology. The Gen IV International Forum (GIF) did a study in 2001-2002 of 19 different reactor designs on 15 different criteria and 24 metrics. The IFR ranked #1 overall. Over 242 experts from around the world participated in the study. It was the most comprehensive evaluation of competitive nuclear designs ever done. Top DOE nuclear management ignored the study because it didn’t endorse the design the Bush administration wanted.¶ The IFR has been sitting on the shelf for 15 years and the DOE currently has no plans to change that.¶ How does the US expect to be a leader in clean energy by ignoring our best nuclear technology? Nobody I’ve talked to has been able to answer that question.¶ We have the technology (it was running for 30 years before we were ordered to tear it down). And we have the money: The Recovery Act has $80 billion dollars. Why aren’t we building a demo plant?¶ IFRs are better than conventional nuclear in every dimension. Here are a few:¶ Efficiency: IFRs are over 100 times more efficient than conventional nuclear. It extracts nearly 100% of the energy from nuclear material. Today’s nuclear reactors extract less than 1%. So you need only 1 ton of actinides each year to feed an IFR (we can use existing nuclear waste for this), whereas you need 100 tons of freshly mined uranium each year to extract enough material to feed a conventional nuclear plant.¶ Unlimited power forever: IFRs can use virtually any actinide for fuel. Fast reactors with reprocessing are so efficient that even if we restrict ourselves to just our existing uranium resources, we can power the entire planet forever (the Sun will consume the Earth before we run out of material to fuel fast reactors). If we limited ourselves to using just our DU “waste” currently in storage, then using the IFR we can power the US for over 1,500 years without doing any new mining of uranium.[5]¶ Exploits our largest energy resource: In the US, there is 10 times as much energy in the depleted uranium (DU) that is just sitting there as there is coal in the ground. This DU waste is our largest natural energy resource…but only if we have fast reactors. Otherwise, it is just waste. With fast reactors, virtually all our nuclear waste (from nuclear power plants, leftover from enrichment, and from decommissioned nuclear weapons)[6] becomes an energy asset worth about $30 trillion dollars…that’s not a typo…$30 trillion, not billion.[7] An 11 year old child was able to determine this from publicly available information in 2004.

#### Alternative methods can’t solve warming – IFRs solve 425ppm threshold

**Kirsch 9** (Steve Kirsch, Bachelor of Science and a Master of Science in electrical engineering and computer science from the Massachusetts Institute of Technology, American serial entrepreneur who has started six companies: Mouse Systems, Frame Technology, Infoseek, Propel, Abaca, and OneID, "How Does Obama Expect to Solve the Climate Crisis Without a Plan?" 7/16/9) <http://www.huffingtonpost.com/steve-kirsch/how-does-obama-expect-to_b_236588.html-http://www.huffingtonpost.com/steve-kirsch/how-does-obama-expect-to_b_236588.html>

The ship is sinking slowly and we are quickly running out of time to develop and implement any such plan if we are to have any hope of saving the planet. What we need is a plan we can all believe in. A plan where our country's smartest people all nod their heads in agreement and say, "Yes, this is a solid, viable plan for keeping CO2 levels from touching 425ppm and averting a global climate catastrophe."¶ ¶ At his Senate testimony a few days ago, noted climate scientist James Hansen made it crystal clear once again that the only way to avert an irreversible climate meltdown and save the planet is to phase out virtually all coal plants worldwide over a 20 year period from 2010 to 2030. Indeed, if we don't virtually eliminate the use of coal worldwide, everything else we do will be as effective as re-arranging deck chairs on the Titanic.¶ ¶ Plans that won't work¶ ¶ Unfortunately, nobody has proposed a realistic and practical plan to eliminate coal use worldwide or anywhere close to that. There is no White House URL with such a plan. No environmental group has a workable plan either.¶ ¶ Hoping that everyone will abandon their coal plants and replace them with a renewable power mix isn't a viable strategy -- we've proven that in the U.S. Heck, even if the Waxman-Markey bill passes Congress (a big "if"), it is so weak that it won't do much at all to eliminate coal plants. So even though we have Democrats controlling all three branches of government, it is almost impossible to get even a weak climate bill passed.¶ ¶ If we can't pass strong climate legislation in the U.S. with all the stars aligned, how can we expect anyone else to do it? So expecting all countries to pass a 100% renewable portfolio standard (which is far far beyond that contemplated in the current energy bill) just isn't possible. Secondly, even if you could mandate it politically in every country, from a practical standpoint, you'd never be able to implement it in time. And there are lots of experts in this country, including Secretary Chu, who say it's impossible without nuclear (a point which I am strongly in agreement with).¶ ¶ Hoping that everyone will spontaneously adopt carbon capture and sequestration (CCS) is also a non-starter solution. First of all, CCS doesn't exist at commercial scale. Secondly, even if we could make it work at scale, and even it could be magically retrofitted on every coal plant (which we don't know how to do), it would require all countries to agree to add about 30% in extra cost for no perceivable benefit. At the recent G8 conference, India and China have made it clear yet again that they aren't going to agree to emission goals.¶ ¶ Saying that we'll invent some magical new technology that will rescue us at the last minute is a bad solution. That's at best a poor contingency plan.¶ ¶ The point is this: It should be apparent to us that we aren't going to be able to solve the climate crisis by either "force" (economic coercion or legislation) or by international agreement. And relying on technologies like CCS that may never work is a really bad idea.¶ ¶ The only remaining way to solve the crisis is to make it economically irresistible for countries to "do the right thing." The best way to do that is to give the world a way to generate electric power that is economically more attractive than coal with the same benefits as coal (compact power plants, 24x7 generation, can be sited almost anywhere, etc). Even better is if the new technology can simply replace the existing burner in a coal plant. That way, they'll want to switch. No coercion is required.

### Nanotech

#### Argonne National Lab has a severe shortfall of quality scientists now – the best and brightest aren’t replacing retirees

Grossenbacher 08[CQ Congressional Testimony, April 23, 2008, John, Laboratory Director Idaho National Laboratory, “NUCLEAR POWER,” SECTION: CAPITOL HILL HEARING TESTIMONY, Statement of John J. Grossenbacher Laboratory Director Idaho National Laboratory, Committee on House Science and Technology, Lexis]

While all of the programs I've highlighted for you individually and collectively do much to advance the state of the art in nuclear science and technology, and enable the continued global expansion of nuclear power, there is a great area of challenge confronting nuclear energy's future. As with most other technologically intensive U.S. industries - it has to do with human capital and sustaining critical science and technology infrastructure. My laboratory, its fellow labs and the commercial nuclear power sector all face a troubling reality - a significant portion of our work force is nearing retirement age and the pipeline of qualified potential replacements is not sufficiently full. Since I'm well aware of this committee's interests in science education, I'd like to update you on what the Department and its labs are doing to inspire our next generation of nuclear scientists, engineers and technicians. Fundamentally, the Office of Nuclear Energy has made the decision to invite direct university partnership in the shared execution of all its R&D programs and will set aside a significant amount of its funds for that purpose. Already, nuclear science and engineering programs at U.S. universities are involved in the Office of Nuclear Energy's R&D, but this move will enable and encourage even greater participation in DOE's nuclear R&D programs. In addition, all NE-supported labs annually bring hundreds of our nation's best and brightest undergraduate and graduate students on as interns or through other mechanisms to conduct real research. For example, at INL we offer internships, fellowships, joint faculty appointments and summer workshops that focus on specific research topics or issues that pertain to maintaining a qualified workforce. This year, we are offering a fuels and materials workshop for researchers and a 10-week training course for engineers interested in the field of reactor operations. Last year, DOE designated INL's Advanced Test Reactor as a national scientific user facility, enabling us to open the facility to greater use by universities and industry and to supporting more educational opportunities. ATR is a unique test reactor that offers the ability to test fuels and materials in nine different prototypic environments operated simultaneously. With this initiative, we join other national labs such as Argonne National Laboratory and Oak Ridge National Laboratory in offering nuclear science and engineering assets to universities, industry and the broader nuclear energy research community. Finally, national laboratories face their own set of challenges in sustaining nuclear science and technology infrastructure - the test reactors, hot cells, accelerators, laboratories and other research facilities that were developed largely in support of prior missions. To obtain a more complete understanding of the status of these assets, the Office of Nuclear Energy commissioned a review by Battelle to examine the nuclear science and technology infrastructure at the national laboratories and report back later this year on findings and recommendations on a strategy for future resource allocation that will enable a balanced, yet sufficient approach to future investment in infrastructure.

#### The plan attracts the best and brightest back to Argonne – successful demonstration of IFR spurs collaborative nuclear interdisciplinary research

Blees 8 [Tom Blees 2008 “Prescription for the Planet: The painless remedy for our energy and environmental crises” Pg. 367]

21. Restart nuclear power development research at national labs like Argonne, concentrating on small reactor designs like the nuclear battery ideas discussed earlier. Given the cost and difficulty of extending power grids over millions of square miles of developing countries, the advantages of distributed generation in transforming the energy environment of such countries can hardly be exaggerated. It is a great pity that many of the physicists and engineers who were scattered when the Argonne IFR project was peremptorily terminated chose to retire. Rebuilding that brain trust should be, well, a no-brainer. If one but looks at the incredible challenges those talented people were able to meet, it seems perfectly reasonable to suppose that a focus on small sealed reactor development could likewise result in similar success. Some of those working on the AHTR and other seemingly unneeded projects could well transition to R&D that fits into the new paradigm. Japanese companies are already eager to build nuclear batteries, and there should be every effort to work in concert with them and other researchers as we develop these new technologies. The options this sort of collaborative research would open up for the many varied types of energy needs around the world would be incalculable.

#### Attracting leading scientists to Argonne key to successful development of the Advanced Photon Source

**Fischetti** et all **9** [“Proceedings of the¶ Advanced Photon Source Renewal Workshop”¶ Hickory Ridge Marriott Conference Hotel¶ Presentation to Department of Energy¶ October 20-21, 2008¶ February 2009¶ Robert F. Fischetti Argonne National Laboratory, Biosciences Division;¶ APS Life Sciences Council representative¶ Paul H. Fuoss Argonne National Laboratory, Materials Science Division;¶ APS Users Organization representative¶ Rodney E. Gerig Argonne National Laboratory, Photon Sciences, Denis T. Keane Northwestern University;¶ DuPont-Northwestern-Dow Collaborative Access Team;¶ APS Partner User Council representative¶ John F. Maclean Argonne National Laboratory, APS Engineering Division¶ Dennis M. Mills, Chair Argonne National Laboratory, Photon Sciences, Dan A. Neumann National Institute of Standards and Technology; APS Scientific Advisory Committee representative¶ George Srajer Argonne National Laboratory, X-ray Science Division]

Scientific Community¶ An enhanced catalyst research beamline with capabilities for in situ XAFS, powder¶ diffraction, and kinetics measurements would benefit the entire catalysis community,¶ i.e., government research laboratories, academia, and industry. The beamline and its¶ staff would also serve as a focal point for expanding catalyst research to other APS¶ beamlines using advanced techniques not routinely applied to catalyst systems, e.g.,¶ SAXS, XES, RIXS, and HERF spectroscopy. Development of these latter methods¶ would position the APS as a leader in this area and attract leading scientists from all¶ over the world. It is expected that new users would initially characterize their materials and identify appropriate systems for specialized techniques.¶ Fig. 4. Cell for in situ x-ray absorption studies of fuel cell¶ catalysts. Standard Fuel Cell Technologies cell hardware¶ was machined to allow x-ray fluorescence studies of cathode electrocatalysts in an operating membrane-electrode¶ assembly (fuel cell). (Argonne National Laboratory photograph)Throughout the U.S. and the world, there are countless research groups working to¶ develop the enabling material in fuel cell catalysis: an oxygen reduction electrocatalyst that is less expensive and more durable than platinum [36-38]. A few of these¶ groups utilize synchrotron-based x-ray techniques to characterize their electrocatalysts; however, these studies are almost exclusively in environments mimicking the¶ reactive environment or are ex situ. A notable exception is the catalyst development¶ effort being led by Los Alamos National Laboratory, which encompasses many approaches and involves many university and national laboratories. As part of this project, Argonne researchers have developed the capability to characterize catalysts¶ containing low-atomic-number elements in an operating fuel cell using XAFS at the¶ APS. Utilizing this cell (Fig. 4), Argonne scientists have determined the active site in¶ a cobalt-containing catalyst. This capability would be extremely useful to other catalyst development teams around the country and the world, and it is envisioned that a¶ dedicated APS electrocatalysis beamline could be designed and made available to¶ these teams. The neutron source at the National Institute of Standards and Technology (NIST) has a beamline dedicated to studies of water transport in fuel cells, which¶ has provided invaluable information for fuel cell materials design. The APS beamline¶ would be the catalyst counterpart to the NIST beamline.¶ A molecular-level understanding of the interactions and correlations that occur in solution and between solution phases is essential to building a predictive capability of a¶ metal ion’s solubility, reactivity, kinetics, and energetics. Until the recent availability¶ of tunable, high-energy x-rays this understanding has been significantly limited by¶ the absence of structural probes. The APS, with its high flux of high-energy x-rays, is¶ the ideal synchrotron source to provide this new information, which is critical to the¶ advancement of solution chemistry. The utility of high-energy x-rays is currently¶ being demonstrated as part of an APS Partner User Proposal (PUP-52), and has received high visibility, including an Inorganic Chemistry feature cover [34]. This effort¶ is interesting a cadre of solution chemists that, to date, have not been part of the user¶ base at synchrotron facilities. The extension of high-energy capabilities from simple¶ PDF experiments to more complex liquid-liquid interfaces is expected to significantly¶ broaden this new interest group into areas including soft-matter studies.

#### APS key to safe nanotech development

**Lindsey 12** [“Scientist Uses Advance Photon Source to Study Nano-Scale Materials”, Laura, Director of Communications and Marketing, The College of Arts and Science, ¶ University of Missouri Columbia, Department of Physics and Astronomy, Jan 25, 2012]

Emerging new technologies utilize advanced materials that are assembled on exceedingly small scales of length. Because of their small size, these nano-scale materials often exhibit unique properties that can potentially be harnessed for applications and new science. In order to do this however, one needs a comprehensive understanding and characterization of their physical behavior on the atomic scale. Professor Paul Miceli is doing just that with the Advanced Photon Source (APS) at Argonne National Laboratory in Argonne, Ill. The APS is the brightest source of x-rays in North America. This machine, which is one kilometer in circumference, allows scientists to collect data with unprecedented detail and in short time frames.¶ “The Advanced Photon Source’s x-ray beam is a billion times more intense than what I can see in my lab,” says Miceli.¶ He deposits thin layers, typically one atom thick, onto a surface from a vapor and then studies the structures by scattering the intense x-ray beam. By doing this, Miceli can determine how the atoms rearrange themselves on the surface so he can develop a better understanding of how nano-structures grow. Because of the unprecedented brightness of the x-ray beam, he is able to observe the materials as they grow in real time. In addition to the unique aspect of the x-ray beam, these studies are facilitated by an extensive ultra-high-vacuum growth-and-analysis chamber residing at the APS that was designed and developed by Miceli.¶ “My findings pertain to basic science about how atoms organize themselves,” says Miceli.¶ Because the x-ray beam can probe both the surface and the subsurface of the materials, Miceli’s research has made discoveries that could not be achieved by other techniques. For example, his research found that nano-clusters of missing atoms become incorporated into metallic crystals as they grow. This discovery is important because it brings new insight to theories of crystal growth, and it forces scientists to think about how atomic-scale mechanisms might lead to the missing atoms**.** Such effects, which also have practical implications for technological applications of nano-materials, have not been considered in current theories.¶ Other studies by Miceli have shown that the growth of some metallic nano-crystals cannot be explained by conventional theories of crystal growth. For example, quantum-mechanical effects on the conduction electrons in very small nano-crystals can change the energy of the crystal, and Miceli showed that the statistical mechanics of coarsening — when large crystals become larger while small crystals get smaller and vanish — does not follow the conventional theories that have worked successfully in materials science over the past 50 years. In fact, he has found that atoms can move over metallic nano-crystalline surfaces thousands of times faster than normal crystals, illustrating the many surprises and challenges that nano-scale materials present to scientists.

#### Nanotech is inevitable – information generation facilitates safe stewardship that prevents grey goo

**Treder and Phoenix 3** [PUBLISHED JANUARY 2003 — REVISED DECEMBER 2003, “Safe Utilization of Advanced Nanotechnology”, Chris Phoenix and Mike Treder, Mike Treder, Executive Director of CRN, BS Biology, University of Washington, Research Fellow with the Institute for Ethics and Emerging Technologies, a consultant to the Millennium Project of the American Council for the United Nations University and to the Future Technologies Advisory Group, serves on the Nanotech Briefs Editorial Advisory Board, is a member of the New York Academy of Sciences and a member of the World Future Society. AND Chris Phoenix, CRN’s Director of Research, has studied nanotechnology for more than 15 years. BS, Symbolic Systems, MS, Computer Science, Stanford University]

Many words have been written about the dangers of advanced nanotechnology. Most of the threatening scenarios involve tiny manufacturing systems that run amok, or are used to create destructive products. A manufacturing infrastructure built around a centrally controlled, relatively large, self-contained manufacturing system would avoid these problems. A controlled nanofactory would pose no inherent danger, and it could be deployed and used widely. Cheap, clean, convenient, on-site manufacturing would be possible without the risks associated with uncontrolled nanotech fabrication or excessive regulation. Control of the products could be administered by a central authority; intellectual property rights could be respected. In addition, restricted design software could allow unrestricted innovation while limiting the capabilities of the final products. The proposed solution appears to preserve the benefits of advanced nanotechnology while minimizing the most serious risks.¶ Advanced Nanotechnology And Its Risks¶ As early as 1959, Richard Feynman proposed building devices with each atom precisely placed1. In 1986, Eric Drexler published an influential book, Engines of Creation2, in which he described some of the benefits and risks of such a capability. If molecules and devices can be manufactured by joining individual atoms under computer control, it will be possible to build structures out of diamond, 100 times as strong as steel; to build computers smaller than a bacterium; and to build assemblers and mini-factories of various sizes, capable of making complex products and even of duplicating themselves.¶ Drexler's subsequent book, Nanosystems3, substantiated these remarkable claims, and added still more. A self-contained tabletop factory could produce its duplicate in one hour. Devices with moving parts could be incredibly efficient. Molecular manufacturing operations could be carried out with failure rates less than one in a quadrillion. A computer would require a miniscule fraction of a watt and one trillion of them could fit into a cubic centimeter. Nanotechnology-built fractal plumbing would be able to cool the resulting 10,000 watts of waste heat. It seems clear that if advanced nanotechnology is ever developed, its products will be incredibly powerful.¶ As soon as molecular manufacturing was proposed, risks associated with it began to be identified. Engines of Creation2 described one hazard now considered unlikely, but still possible: grey goo. A small nanomachine capable of replication could in theory copy itself too many times4. If it were capable of surviving outdoors, and of using biomass as raw material, it could severely damage the environment5. Others have analyzed the likelihood of an unstable arms race6, and many have suggested economic upheaval resulting from the widespread use of free manufacturing7. Some have even suggested that the entire basis of the economy would change, and money would become obsolete8.¶ Sufficiently powerful products would allow malevolent people, either hostile governments or angry individuals, to wreak havoc. Destructive nanomachines could do immense damage to unprotected people and objects. If the wrong people gained the ability to manufacture any desired product, they could rule the world, or cause massive destruction in the attempt9. Certain products, such as vast surveillance networks, powerful aerospace weapons, and microscopic antipersonnel devices, provide special cause for concern. Grey goo is relevant here as well: an effective means of sabotage would be to release a hard-to-detect robot that continued to manufacture copies of itself by destroying its surroundings.¶ Clearly, the unrestricted availability of advanced nanotechnology poses grave risks, which may well outweigh the benefits of clean, cheap, convenient, self-contained manufacturing. As analyzed in Forward to the Future: Nanotechnology and Regulatory Policy10, some restriction is likely to be necessary. However, as was also pointed out in that study, an excess of restriction will enable the same problems by increasing the incentive for covert development of advanced nanotechnology. That paper considered regulation on a one-dimensional spectrum, from full relinquishment to complete lack of restriction. As will be shown below, a two-dimensional understanding of the problem—taking into account both control of nanotech manufacturing capability and control of its products—allows targeted restrictions to be applied, minimizing the most serious risks while preserving the potential benefits.

#### Extinction in 72 hours

Mark Pesce, BS Candidate at MIT, October, 1999, “Thinking Small,” FEED Magazine, http://hyperreal.org/~mpesce/ThinkingSmall.html

The nanoassembler is the Holy Grail of nanotechnology; once a perfected nanoassembler is available, almost anything becomes possible – which is both the greatest hope and biggest fear of the nanotechnology community. Sixty years ago, John Von Neumann – who, along with Alan Turing founded the field of computer science – surmised that it would someday be possible to create machines that could copy themselves, a sort of auto-duplication which could lead from a single instance to a whole society of perfect copies. Although such a Von Neumann machine is relatively simple in theory, such a device has never been made – because it’s far easier, at the macromolecular scale, to build a copy of a machine than it is to get the machine to copy itself. At the molecular level, this balance is reversed; it’s far easier to get a nanomachine to copy itself than it is to create another one from scratch. This is an enormous boon – once you have a single nanoassembler you can make as many as you might need – but it also means that a nanoassembler is the perfect plague. If – either intentionally or through accident – a nanoassembler were released into the environment, with only the instruction to be fruitful and multiply, the entire surface of the planet – plants, animals and even rocks - would be reduced to a “gray goo” of such nanites in little more than 72 hours. This “gray goo problem”, well known in nanotechnology acts as a check against the unbounded optimism which permeates scientific developments in atomic-scale devices. Drexler believes the gray goo problem mostly imaginary, but does admit the possibility of a “gray dust” scenario, in which replicating nanites “smother” the Earth in a blanket of sub-microscopic forms. In either scenario, the outcome is much the same. And here we encounter a technological danger unprecedented in history: If we had stupidly blown ourselves to kingdom come in a nuclear apocalypse, at least the cockroaches would have survived. But in a gray goo scenario, nothing – not even the bacteria deep underneath the ground – would be untouched. Everything would become one thing: a monoculture of nanites.

### Solvency

#### Contention 4: Solvency

#### Loan guarantees solve – conservative arguments about cronyism and risk underestimation ignore 20 years of loan guarantee data to the contrary

**Griffith and Caperton, 12** - John Griffith is a Policy Analyst with the Economic Policy team at the Center for American Progress. Richard Caperton is the Director of Clean Energy Investment at the Center (Major Analysis: Federal Loans And Loan Guarantees Have A Huge Benefit But A Low And Predicatable Cost, 5/3, <http://thinkprogress.org/climate/2012/05/03/475978/major-analysis-federal-loans-and-loan-guarantees-have-a-huge-benefit-but-a-low-and-predicatable-cost/>)

These programs typically run at very low cost to taxpayers. On average, every $1 allocated to loan and guarantee programs generates more than $99 of economic activity from individuals, businesses, nonprofits, and state and local governments, according to our analysis.¶ But in the wake of certain widely publicized credit blunders, most notably this past summer’s bankruptcy announcement from solar company Solyndra LLC, some have called into question Washington’s ability to manage financial risk. Conservative critics contend that the government is incapable of accurately pricing risk, and that political pressure encourages government agencies to routinely underestimate the risk to taxpayers when extending credit.¶ Government underpricing of risk is a convenient theory for free-market ideologues but it runs contrary to the overwhelming evidence.¶ Our review of federal government credit programs back to 1992 shows that on average the government is quite accurate in its risk pricing. In fact, the majority of government credit programs cost less than originally estimated, not more. Specifically, we found that:¶ Based on initial estimates over the past 20 years, the government expected its credit programs to cost taxpayers 79 cents for every $100 loaned or guaranteed. Based on recently updated data, those cost predictions were reasonably accurate but slightly underestimated. The current budgetary impact of these programs is about 94 cents per $100 loaned or guaranteed.¶ There’s little evidence that credit programs are biased toward underpricing risk. In fact, a little more than half of all nonemergency federal credit programs will cost the government less than what they are expected to over the life of the program.¶ The remainder is accounted for by the losses suffered by the Federal Housing Administration on loans made in 2008 during the peak of the housing crisis. Excluding that book of loans, all nonemergency federal credit programs cost slightly less than expected.¶ Conservative critics often portray a world in which government bureaucrats haphazardly issue loans and loan guarantees without considering taxpayer exposure to risk. That’s simply not the case. This issue brief explains how the government prices credit risk in the federal budget, how well those cost estimates have reflected reality over the years, and why the government is in a particularly good position to assume certain types of risk.¶ Budgeting for credit risk¶ Federal government agencies adhere to strict budget and accounting standards to carefully assess the risks and potential losses associated with credit programs. Here’s how it works.¶ Before an agency can issue any loans or loan guarantees, Congress must first authorize and allocate funding for the program. In most cases Congress starts by determining how much money the program will be authorized to guarantee or loan and then appropriates a certain percentage of that amount to cover the program’s expected cost to the government. That cost estimate—assessed by both the agency administering the program and the president’s Office of Management and Budget—takes into account expected repayments, defaults, recoveries, and any interest or fees collected over the life of the loan, adjusted to current dollars.¶ The net cost to the federal government as a percentage of total dollars loaned or guaranteed is known as the subsidy rate. As an example, say Congress approves a $100 million loan guarantee program within the Department of Agriculture. The department models expected market conditions and loan activity and then estimates a subsidy rate, which the Office of Management and Budget independently estimates as a check on the agency’s methodology. Let’s say the estimated subsidy rate is 0.75 percent. That means the government expects to take a net loss of 75 cents for every $100 it guarantees over the life of those loans. To cover expected losses on the $100 million in loan guarantees, the government sets aside $750,000 in a special account at the Treasury Department. This is similar to a loan loss reserve at a private bank.¶ Each subsequent year, the Office of Management and Budget and the agencies recalculate the subsidy rate to reflect actual loan performance, current economic conditions, and anything else administrators may have learned about a program. These revised numbers are reported in the president’s budget each year, which gives us a pretty good idea of each program’s “actual” costs and the government’s ability to assess financial risk.¶ If conservative claims were accurate in saying that the federal government cannot accurately price for risk, then one would expect the initial cost estimates to be significantly lower than the more recent re-estimates. Using the Department of Agriculture example above, if the critics were right, the re-estimated subsidy rate would presumably be much higher than 0.75 percent, and actual outlays would be higher than estimated. Let’s see how the government’s risk estimates actually stack up.¶ Government risk estimates are quite accurate¶ To test this theory, we analyzed credit data published in the president’s 2013 budget. We compared initial and updated cost estimates, also known as subsidy re-estimates, for each book of nonemergency loans and loan guarantees for each federal credit program since 1992, the first year for which comprehensive data are available.¶ We limit our analysis to nonemergency credit programs, omitting programs created in response to the recent financial crisis. This includes programs created through the Troubled Asset Relief Program—the so-called Wall Street rescue package passed by Congress at the height of the housing and financial crises—and the U.S. Department of the Treasury’s purchase of securities issued by the two troubled housing finance giants Fannie Mae and Freddie Mac. Both of these programs are temporary, atypically large, and are accounted for in the federal budget using different standards than all other credit programs.¶ If we had included these “emergency” programs, it would drastically skew the overall results—but skew them in favor of our basic argument. Based on our analysis of data published in the 2013 budget, these programs will cost the government about $130 billion less than initially expected. So their inclusion would make it seem as though the government significantly overestimated the cost of all credit programs over the past 20 years, which is not the case.¶ We also exclude any federal credit program that is not listed in the federal credit supplement of president’s budget, and any program that did not publish a subsidy re-estimate in the 2013 budget. We do this both because complete data are unavailable for these programs and because their costs are not recorded in the federal budget. Notably, this includes insurance programs through the Federal Deposit Insurance Corporation, mortgage guarantees offered by the two housing finance giants Fannie Mae and Freddie Mac (both now under government conservatorship), and guarantees on mortgage-backed securities offered by the government corporation Ginnie Mae.¶ Here’s what we found out about nonemergency federal credit programs. Federal agencies have issued $5.7 trillion worth of these loans or loan guarantees since 1992. Based on our analysis of initial estimates, the government expected these programs to cost taxpayers about 79 cents for every $100 loaned or guaranteed, or a 0.79 percent subsidy rate overall.¶ Of course, no one expects those estimates to be perfect. Many of these loans such as home mortgages or funding for large infrastructure projects take decades to pay back. Government financial analysts are charged with the difficult task of modeling payments, defaults, recoveries, and market conditions for the entire life of the loan, so some error has to be expected.¶ But as it turns out, the initial estimates weren’t very far off. The current budgetary impact of these credit programs is about 94 cents per $100 loaned or guaranteed, or a 0.94 percent subsidy rate, according to our analysis of updated subsidy estimates. To put that in a budgetary context, while issuing nearly $6 trillion in loans and guarantees over the past 20 years, the government initially predicted about $45 billion in total costs to taxpayers, but the actual costs were slightly higher—about $53 billion.¶ That difference—$8 billion over two decades or $400 million per year—might seem high at first. But it amounts to just 0.15 percent of the total dollars loaned or guaranteed by the government and 0.02 percent of all government spending over that period.(see Figure 1)¶ Of course, the federal government’s performance on individual programs varied substantially. Some programs overestimate risks, while others underestimate. But as mentioned above, some conservatives argue that political pressures cause the government to systemically underprice costs to taxpayers when issuing loans or guarantees.¶ The data show this to be untrue. Of the 104 nonemergency credit programs administered since 1992, our analysis shows that most have actually overestimated total subsidy costs. Fifty-six programs overpriced risk over their lifetimes, while 48 programs underpriced risk. (see Figure 2)¶ Our analysis only takes into account lifetime costs for each program, not the federal government’s ability to estimate costs on an individual year’s portfolio of loans. Indeed, critics often point to individual data points such as the Solyndra bankruptcy as evidence of the government’s inability to price financial risk. But what matters most is actually the net budgetary impact over time of these inaccuracies, which is what is measured in Figure 1.¶ Overall these overestimates and underestimates—whether across programs or in individual books of business—tend to roughly balance out in the long run, give or take a reasonable margin of error. As we show in the following section, however, all of these underestimated losses can actually be attributed to a single year of mortgage guarantees made at the height of the housing crisis.

#### Government support is vital-~--it overcomes financial barriers to nuclear that the market cannot

Yanosek 12 Kassia, entrepreneur-in-residence at Stanford University’s Steyer-Taylor Center for Energy Policy and Finance and a private equity investor in the energy sector as a principal at Quadrant Management and Founder of Tana Energy Capital LLC, " Financing Nuclear Power in the US", Spring, energyclub.stanford.edu/index.php/Journal/Financing\_Nuclear\_Power\_by\_Kassia\_Yanosek

Over the course of the last decade, it appeared that concerns about carbon emissions, aging coal fleets, and a desire for a diversified generation base were reviving the U.S. utility sector interest in building new nuclear plants. Government and companies worked closely on design certification for Generation III reactors, helping to streamline the licensing process. New loan guarantees from the federal government targeted for nuclear projects were created as part of the 2005 Energy Policy Act. Consequently, dozens of projects entered the planning stages. Following more than 30 years in which no new units were built, it looked as if the U.S. nuclear industry was making significant headway. However, it is yet to be seen how many new nuclear projects will actually make it beyond blueprints due to one of the largest barriers to new nuclear construction: financing risk. Large upfront capital costs, a complex regulatory process, uncertain construction timelines, and technology challenges result in a risk/return profile for nuclear projects that is unattractive for the capital markets without supplementary government or ratepayer support. To many investors, nuclear seems too capital-intensive. Nuclear energy has attractive qualities in comparison to other sources of electricity. A primary motivation to pursue the development of nuclear energy in the U.S. has been its low operating fuel costs compared with coal, oil, and gas-fired plants. Over the lifetime of a generating station, fuel makes up 78% of the total costs of a coal-fired plant. For a combined cycle gas-fired plant, the figure is 89%. According to the Nuclear Energy Institute, the costs for nuclear are approximately 14%, and include processing, enrichment, and fuel management/disposal costs. Today’s low natural gas prices have enhanced the prospects of gas-fired power, but utilities still remain cautious about over-investing in new natural gas generation given the historical volatility of prices. Furthermore, nuclear reactors provide baseload power at scale, which means that these plants produce continuous, reliable power to consistently meet demand. In contrast, renewable energies such as wind or solar are only available when the wind blows or the sun shines, and without storage, these are not suitable for large-scale use. Finally, nuclear energy produces no carbon emissions, which is an attractive attribute for utilities that foresee a carbon tax being imposed in the near future. Given nuclear’s benefits, one may wonder why no new nuclear units have been ordered since the 1970s. This hiatus is in great part due to nuclear’s high cost comparative to other alternatives, and its unique set of risks. As a result, financing nuclear has necessitated government involvement, as the cost of nuclear typically exceeds that of the cost of conventional generation technologies such as coal and natural gas fired generation on a levelized cost of energy (LCOE) basis. LCOE represents the present value of the total cost of building and operating a generating plant over its financial life, converted to equal annual payments and amortized over expected annual generation, and is used to compare across different power generation technologies. For both regulated utilities and independent power producers, nuclear is unattractive if the levelized cost exceeds that of other technologies, since state utility commissions direct regulated utilities to build new capacity using the technology with the lowest LCOE. Furthermore, capital costs are inherently high, ranging in the billions or tens of billions of dollars, and are compounded by financing charges during long construction times. Without government support, financing nuclear is currently notpossible in the capital markets. Recently, Constellation Energy and NRG separately pulled the plug on new multi-billion dollar plants, citing financing problems. Projects, however, will get done on a one-off basis. Southern Company’s Vogtle Plant in Eastern Georgia is likely to be the sponsor of the first new generation to be constructed, taking advantage of local regulatory and federal support. Two new reactors of next-generation technology are in the permitting stage, which will bring online 2,200 megawatts (MW) of new capacity, and will cost $14 billion. The project will take advantage of tax credits and loan guarantees provided in the 2005 Energy Policy Act.

#### And, loan guarantees solve nuclear expansion – shows investors the government has skin in the game, and incentivizes quick agency approval

Adams 10—Publisher of Atomic insights Was in the Navy for 33 years Spent time at the Naval Academy Has experience designing and running small nuclear plants (Rod, Concrete Action to Follow Strongly Supportive Words On Building New Nuclear Power Plants, atomicinsights.com/2010/01/concrete-action-to-follow-strongly-supportive-words-on-building-new-nuclear-power-plants.html)

Loan guarantees are important to the nuclear industry because the currently available models are large, capital intensive projects that need a stable regulatory and financial environment. The projects can be financed because they will produce a regular stream of income that can service the debt and still provide a profit, but that is only true if the banks are assured that the government will not step in at an inopportune time to halt progress and slow down the revenue generation part of the project. Bankers do not forget history or losses very easily; they want to make sure that government decisions like those that halted Shoreham, Barnwell’s recycling facility or the Clinch River Breeder Reactor program are not going to be repeated this time around. For the multi-billion dollar projects being proposed, bankers demand the reassurance that comes when the government is officially supportive and has some “skin in the game” that makes frivolous bureaucratic decisions to erect barriers very expensive for the agency that makes that decision. I have reviewed the conditions established for the guarantee programs pretty carefully – at one time, my company ([Adams Atomic Engines, Inc.](http://www.atomicengines.com)) was considering filing an application. The loan conditions are strict and do a good job of protecting government interests. They were not appropriate for a tiny company, but I can see where a large company would have less trouble complying with the rules and conditions. The conditions do allow low or no cost intervention in the case of negligence or safety issues, but they put the government on the hook for delays that come from bad bureaucratic decision making.

#### Plan is modeled internationally

**Blees et al** 11 (Tom Blees1, Yoon Chang2, Robert Serafin3, Jerry Peterson4, Joe Shuster1, Charles Archambeau5, Randolph Ware3, 6, Tom Wigley3,7, Barry W. Brook7, 1Science Council for Global Initiatives, 2Argonne National Laboratory, 3National Center for Atmospheric Research, 4University of Colorado, 5Technology Research Associates, 6Cooperative Institute for Research in the Environmental Sciences, 7(climate professor) University of Adelaide, "Advanced nuclear power systems to mitigate climate change (Part III)," 2/24/11) <http://bravenewclimate.com/2011/02/24/advanced-nuclear-power-systems-to-mitigate-climate-change/-http://bravenewclimate.com/2011/02/24/advanced-nuclear-power-systems-to-mitigate-climate-change/>

There are many compelling reasons to pursue the rapid demonstration of a full-scale IFR, as a lead-in to a subsequent global deployment of this technology within a relatively short time frame. Certainly the urgency of climate change can be a potent tool in winning over environmentalists to this idea. Yet political expediency—due to widespread skepticism of anthropogenic causes for climate change—suggests that the arguments for rolling out IFRs can be effectively tailored to their audience. Energy security—especially with favorable economics—is a primary interest of every nation.¶ The impressive safety features of new nuclear power plant designs should encourage a rapid uptick in construction without concern for the spent fuel they will produce, for all of it will quickly be used up once IFRs begin to be deployed. It is certainly manageable until that time. Burying spent fuel in non-retrievable geologic depositories should be avoided, since it represents a valuable clean energy resource that can last for centuries even if used on a grand scale.¶ Many countries are now beginning to pursue fast reactor technology without the cooperation of the United States, laboriously (and expensively) re-learning the lessons of what does and doesn’t work. If this continues, we will see a variety of different fast reactor designs, some of which will be less safe than others. Why are we forcing other nations to reinvent the wheel? Since the USA invested years of effort and billions of dollars to develop what is arguably the world’s safest and most efficient fast reactor system in the IFR, and since several nations have asked us to share this technology with them (Russia, China, South Korea, Japan, India), there is a golden opportunity here to develop a common goal—a standardized design, and a framework for international control of fast reactor technology and the fissile material that fuels them. This opportunity should be a top priority in the coming decade, if we are serious about replacing fossil fuels worldwide with sufficient pace to effectively mitigate climate change and other environmental and geopolitical crises of the 21st century.

#### IFRs are ready for commercial application – solves tech leadership and coal plants

**Kirsh 11** (Steven T. Kirsh, Bachelor of Science and a Master of Science in electrical engineering and computer science from the Massachusetts Institute of Technology, “Why Obama should meet Till,” 9/28/11) http://bravenewclimate.com/2011/09/28/why-obama-should-meet-till/¶ I will tell you the story of an amazing clean power technology that can use nuclear waste for fuel and emit no long-lived nuclear waste; that can supply clean power at low cost for our planet, 24×7, for millions of years without running out of fuel. I will tell you why this technology is our best bet to reduce the impact of global warming on our planet. And finally, I will tell you why nobody is doing anything about it and why this needs to be corrected.¶ If you act on this letter, you will save our country billions of dollars and allow us to become leaders in clean energy. If you delegate it downward, nothing will happen.¶ I have no vested interest in this; I am writing because I care about the future of our planet¶ First, since we met only briefly during the Obama campaign, let me provide a little background about myself. I am a high-tech entrepreneur and philanthropist based in Silicon Valley. I have received numerous awards for my philanthropy. For example, in 2003, I was honored to receive a National Caring Award presented by then Senator Clinton. The largest engineering auditorium at MIT is named in my honor. The first community college LEED platinum building in the nation is also named in my honor.¶ I am also active in Democratic politics. In the 2000 election, for example, I was the single largest political donor in the United States, donating over $10 million dollars to help Al Gore get elected. Unfortunately, we lost that one by one vote (on the Supreme Court).¶ I have no vested interest in nuclear power or anything else that is described below. I write only as someone who cares about our nation, the environment, and our planet. I am trying to do everything I can so my kids have a habitable world to live in. Nothing more.¶ Dr. James Hansen first made me aware of fast reactors in his letter to Obama in 2009¶ As an environmentalist, I have been a fan of Jim Hansen’s work for nearly two decades. Many consider Dr. Hansen to be the world’s leading expert on global warming. For example, Hansen was the first person to make Congress aware of global warming in his Senate testimony in 1988. Hansen is also Al Gore’s science advisor.¶ In 2009, Dr. Hansen wrote a letter to President Obama urging him to do just three things that are critical to stop global warming: 1) phase out coal plants, 2) impose a feebate on carbon emissions with a 100% rebate to consumers and 3) re-start fourth generation nuclear plants, which can use nuclear waste as fuel. Hansen’s letter to Obama is documented here: http://www.guardian.co.uk/environment/2009/jan/02/obama-climate-change-james-hansen¶ Upon reading Hansen’s recommendations, I was fascinated by the last recommendation. The fourth-generation power plants Hansen advocated sounded too good to be true. If what Hansen was saying was true, then why wasn’t our nation jumping on that technology? It made no sense to me.¶ Lack of knowledge, misinformation, and the complexity of nuclear technology have hampered efforts to get a fast reactor built in the US¶ I spent the next two years finding out the answer to that question. The short answer is three-fold: (1) most people know absolutely nothing about the amazing fourth generation nuclear power plant that we safely ran for 30 years in the US and (2) there is a lot of misleading information being spread by seemingly respectable people (some of whom are in the White House) who never worked on a fourth generation reactor that is totally false. It’s not that they are misleading people deliberately; it’s just that they were either listening to the wrong sources or they are jumping to erroneous conclusions. For example, the most popular misconception is that “reprocessing is a proliferation risk.” That statement fails to distinguish between available reprocessing techniques. It is absolutely true for the French method but it is absolutely not true for the technology described in this letter! The third reason is that the technology is complicated. Most people don’t know the difference between oxide fuel and metal fuel. Most people don’t know what a fast reactor is. Most people can’t tell you the difference between PUREX, UREX, and pyroprocessing. So people with an agenda can happily trot out arguments that support their beliefs and it all sounds perfectly credible. They simply leave out the critical details.¶ We don’t need more R&D. We already have a technology in hand to help us solve global warming and safely get rid of our nuclear waste at low cost. But we aren’t doing anything with it. That’s a serious mistake.¶ Today, our nation faces many serious challenges such as:¶ How can we avert global warming?¶ How can we dispose of our existing nuclear waste safely?¶ How can we generate base-load carbon-free power at very low cost?¶ How can we avoid creating any additional long-lived nuclear waste?¶ How can we grow our economy and create jobs?¶ How can we become the world leader in clean energy?¶ How can we do all of the above while at the same time spending billions less than we are now?¶ The good news is that we already have a proven technology that can address all of these problems. It is a technology that has enjoyed over 30 years of bi-partisan Congressional and Presidential support. It is an advanced nuclear technology that was invented in 1951 by the legendary Walter Zinn and then refined and perfected over a 30 year period, from 1964 to 1994 by Dr. Charles Till who led a team of 1,200 people at the Argonne National Laboratory. Till’s reactor was known as the Integral Fast Reactor (IFR) because it both produced power and recycled its own waste back into the reactor. This is the technology that Hansen referenced in his letter to the President.¶ The IFR is a fourth-generation nuclear design that has several unique and valuable characteristics:¶ It can use our existing nuclear waste (from power plants and weapons) as fuel; we have over 1,000 years of power available by just using today’s nuclear waste. Instead of trying to bury that “waste” in Yucca Mountain, we could be using it for fuel in fast reactors.¶ It generates no long-lived nuclear waste.¶ It is safer than today’s light water reactor (LWR) nuclear power plants. Unlike the Fukushima LWR reactors (a second generation nuclear technology invented 50 years ago), the IFR does NOT require electricity to shut down safely. The IFR shuts down passively if a mishap occurs; no operator intervention or active safety systems are required. They ran the Three Mile Island and Chernobyl scenarios on a live reactor and the reactor shut itself down safely, no operator intervention required, just as predicted. In addition, unlike with LWRs, the IFR runs at low pressure which adds to the safety profile.¶ It reduces the risk of nuclear proliferation because: (1) it eliminates the need for enrichment facilities (which can be used for making nuclear bomb material), (2) the nuclear material that is used in the IFR is not suitable for making bombs and (2) because the nuclear material in the reactor and in the reprocessing hot cell is too “hot” to be stolen or used in a weapon.¶ Experts at General Electric (GE) believe that the IFR has the potential to produce power for less than the price of coal. Dr. Loewen can confirm that if you have any doubts.¶ GE already has an IFR design on the table that they would like to build as soon as possible. Dr. Loewen can confirm that as well.¶ The US Nuclear Regulatory Commission, in January 1994, issued a pre-application safety evaluation report in which they found no objections or impediments to licensing the IFR. You can see the NRC report in the 8 minute video.¶ The design is proven. It produced electric power without mishap for 30 years before the project was abruptly cancelled.¶ Dr Charles Till¶ The IFR’s ability to solve the nuclear waste problem should not be underestimated. As respected nuclear experts have pointed out, a practical solution to the nuclear waste problem is required if we are to revive nuclear power in the United States. The Blue Ribbon Commission (BRC) on America’s Nuclear Future basically concluded this: “continue doing the same thing we are doing today and keep doing R&D.” That was predictable because it was a consensus report; everyone had to agree. So nothing happened. And because there was no consensus from the BRC , there is less money for nuclear because there is no solution to the waste problem. It’s a downward death spiral.¶ Please pardon me for a second and allow me to rant about consensus reports. In my 30 year career as an entrepreneur, I’ve raised tens of millions of millions of dollars in investment capital from venture capitalists all over the world. I always ask them how they make investment decisions. They always tell me, “If we had to get all partners to agree on an investment, we’d never make any investments. If you can get two partners to champion your company, that is sufficient to drive an investment decision.” Therefore, if you want to get nothing done, ask for a consensus report. If you want to actually solve problems, you should listen to what the people most knowledgeable about the problem are saying.¶ Dr Yoon I. Chang¶ Had President Obama asked the Commissioners on the Nuclear Regulatory Commission (NRC) who have the most knowledge of fast reactors the same question that he tasked the BRC with, he would have gotten a completely different answer. They would have told President Obama that fast reactors and pyroprocessing are the way to go and we better get started immediately with something that we already know works because there is still a ten year time if we were to start the reactor building process today. Their advice leads to a viable solution that we know will work and it will make the US a leader in clean nuclear power. Following the BRC’s consensus advice will lead to decades of inaction. Totally predictable.¶ If we put a national focus on developing and cost reducing the IFR, we’d have a killer product and lead the world in being a clean energy leader¶ It would be great if we had a long-term strategy and vision for how we become energy independent and solve the global warming problem and help our economy at the same time. The IFR can play a key role in that vision. If we put a national focus on developing and commercializing the IFR technology we invented, we can create jobs, help our trade balance, mitigate global warming, become energy independent, show the world a safe way to get rid of nuclear waste, and become the leaders in clean power technology.¶ Nuclear power is the elephant in the room. Even though we haven’t built a new nuclear plant in 30 years, nuclear still supplies 70% of the clean energy in America today. That feat was largely accomplished in a single ten year period. Renewables have had 3 decades to “catch up” and they aren’t anywhere close. Nuclear’s continued dominance shows that nuclear power is indeed the elephant in the room when it comes to being able to install clean energy quickly and affordably.¶ The bad news is that President Clinton decided that this technology, which would have produced unlimited amounts of base-load carbon-free power for a price as low as anything else available today, was not needed and cancelled the project in 1994.¶ Cancelling the IFR was a big mistake. It’s still the world’s best fast nuclear technology according to an independent study by the Gen IV International Forum.¶ Many top scientists all over the world believe that President Clinton’s decision was a huge mistake. The Senate had voted to continue to fund it. The project had been supported by six US Presidents; Republicans and Democrats. In fact, the project’s biggest proponent was Republican President Richard Nixon who said in 1971, “Our best hope today for meeting the Nation’s growing demand for economical clean energy lies with the fast breeder reactor.”¶ Republican Senator Kempthorne said of the IFR cancellation:¶ Unfortunately, this program was canceled just 2 short years before the proof of concept. I assure my colleagues someday our Nation will regret and reverse this shortsighted decision. But complete or not, the concept and the work done to prove it remain genius and a great contribution to the world.¶ While I am not a big fan of Senator Kempthorne, I couldn’t agree more with what he said in this particular case.¶ The IFR remains the single best advanced nuclear power design ever invented. That fact was made clear when in 2002, over 240 leading nuclear scientists from all over the world (in a Gen IV International Forum sponsored study) independently evaluated all fourth-generation nuclear designs and ranked the IFR the #1 best overall advanced nuclear design.¶ The IFR was cancelled in 1994 without so much as a phone call to anyone who worked on the project. They didn’t call then. They haven’t called since. They simply pulled the plug and told people not to talk about the technology.¶ The US government invested over $5 billion dollars in the IFR. Fast reactor R&D is largest single technology investment DOE has ever made. According to a top DOE nuclear official (Ray Hunter, the former NE2 at DOE), the “IFR became the preferred path because of waste management, safety, and economics.” The reactor produced power for 30 years without incident. Despite that track record, before it was cancelled, nobody from the White House ever met with anyone who worked on the project to discuss whether it should be terminated or not. It was simply unilaterally terminated by the White House for political reasons. Technical experts were never consulted. To this day, no one from the White House has met with Dr. Till to understand the benefits of the project. The technical merits simply did not matter.¶ I urge you to recommend to President Obama that he meet personally with Dr. Charles Till so that the President can hear first hand why it is so critical for the health of our nation and our planet that this project, known as the Integral Fast Reactor (IFR), be restarted. Dr. Till headed the project at Argonne National Laboratory until his retirement in 1997. He is, without a doubt, the world’s leading expert on IFR technology.¶ Want to solve global warming? Easy. Just create a 24×7 clean power source that costs the same as coal. Prominent scientists believe that the IFR can achieve this.¶ Dr. Hansen has pointed out many times that it is imperative to eliminate all coal plants worldwide since otherwise, we will never win the battle against global warming. But we know from experience that treaties and agreements do not work. Here’s a quote from an article (“The Most Important Investment that We Aren’t Making to Mitigate the Climate Crisis”) that I wrote in December 2009 published in the Huffington Post:¶ If you want to get emissions reductions, you must make the alternatives for electric power generation cheaper than coal. It’s that simple. If you don’t do that, you lose.¶ The billions we invest in R&D now in building a clean and cheaper alternative to coal power will pay off in spades later. We have a really great option now — the IFR is on the verge of commercial readiness — and potential competitors such as the Liquid Fluoride Thorium Reactor (LFTR) are in the wings. But the US government isn’t investing in developing any of these breakthrough new base-load power generation technologies. Not a single one.¶ I found it really amazing that global leaders were promising billions, even hundreds of billions in Copenhagen for “fighting climate change” when they weren’t investing one cent in the nuclear technologies that can stop coal and replace it with something cheaper.¶ [ Note: 6 days ago, on September 22, 2011, DOE agreed to give $7.5M to MIT to do R&D on a molten-salt reactor. That’s good, but we should be building the technology we already have proven in 30 years of operational experience before we invest in unproven new technologies. ]¶ Dr. Loewen has personally looked at the costs for the building the IFR in detail and believes the IFR can generate power at a cost comparable to a coal plant. So it’s arguably our best shot at displacing coal plants. This is precisely why Dr. Hansen believes that the IFR should be a top priority if we want to save our planet.¶ It isn’t just nuclear experts that support the IFR¶ US Congressman John Garamendi (D-CA) is also a major IFR supporter. When he was Lt. Governor of California, Congressman Garamendi convened a panel of over a dozen our nation’s top scientists to discuss the IFR technology. As a result of that meeting, Garamendi became convinced that the IFR is critically important and he is currently trying very hard to get a bill passed in the House to restart it. Unfortunately, virtually everyone in Congress seems to have forgotten about this project even though in the 1970’s it was the President’s top energy priority. Nothing has changed since then. No other clean energy technology has been invented that is superior to the IFR for generating low-cost carbon-free base-load electric power.¶ Bill Gates also found exactly the same thing when he looked at how to solve the global warming problem. As he explained in a recent TED talk, renewables will never solve the climate crisis. The only viable technology is fourth-generation nuclear power and the best advanced nuclear technology is the IFR. That is why this is Gate’s only clean energy investment. Gates’ TerraPower Travelling Wave Reactor (TWR) is a variant of the IFR design. When Gates approached DOE to try to build his reactor in the US, he was told to build it outside of the US.¶ Nobel prize winner Hans Bethe (now deceased) was an enthusiastic supporter. Freeman Dyson called Bethe the “supreme problem solver of the 20th century. Chuck Till told me the following story of Bethe’s support for the IFR:¶ A tale from the past: A year or two before the events I’ll describe, Hans Bethe had been contacted by the Argonne Lab Director for his recommendation on who to seek to replace the existing head of Argonne’s reactor program.¶ Bethe told him the best choice was already there in the Lab, so it was in this way that I was put in charge. I had had quite a few sessions with him in the years leading up to it, as we were able to do a lot of calculations on the effects of reactor types on resources that he didn’t have the capability at his disposal to do himself.¶ So when I wanted to initiate the IFR thrust, the first outside person I went to was Bethe at Cornell. After a full day of briefing from all the specialists I had taken with me, he suggested a brief private meeting with me. He was direct. He said “All the pieces fit. I am prepared to write a letter stating this. Who do you want me to address it to? I think the President’s Science Advisor, don’t you?” I said the obvious – that his opinion would be given great weight, and would give instant respectability.¶ He went on, “I know him quite well. Who else?” I said I was sure that Senator McClure (who was chairman of Senate Energy and Resources at the time) would be relieved to hear from him. That the Senator would be inclined to support us, as we were fairly prominent in the economy of the state of Idaho, and for that reason I had easy access to him. But to know that Hans Bethe, a man renowned for his common sense in nuclear and all energy matters, supported such an effort would give him the Senator solid and quotable reason for his own support, not dismissible as parochial politics, that the Senator would want if he was to lead the congressional efforts. “Yes,” he said in that way he had, “I agree.”¶ I’ve always thought that the President’s Science Advisor’s intervention with DOE, to give us a start, was not the result of our meeting him, but rather it was because of the gravitas Hans Bethe provided with a one page letter.¶ How do we lead the world in clean energy if we put our most powerful clean energy technology on the shelf?!?¶ President Obama has stated that he wants the US to be a leader in clean energy. I do not see how we achieve that if we allow our most advanced clean energy technology to sit on the shelf collecting dust and we tell one of America’s most respected businessmen that he should build his clean energy technology in another country. We have an opportunity here to export energy technology to China instead of importing it. But due to Clinton’s decision, we are allowing the Russians to sell similar fast reactor technology to the Chinese. It should have been us.¶ Re-starting the IFR will allow us to cancel a $10 billion stupid expenditure. The IFR only costs $3B to build. We’d get more, pay less. On pure economics alone, it’s a no brainer.¶ Finally, even if you find none of the arguments above to be compelling, there is one more reason to restart the IFR project: it will save billions of dollars. Today, we are contracting with the French to build a MOX reprocessing plant in Savannah River. The cost of that project is $10 billion dollars. We are doing it to meet our treaty obligations with the Russians. Former top DOE nuclear managers agree this is a huge waste of money because we can build an IFR which can reprocess 10 times at much weapons waste per year for a fraction of that cost.¶ The Russians are laughing at our stupidity. They are going to be disposing of their weapons waste in fast reactors, just like we should be. The Russians are also exporting their fast reactors to the Chinese. Had the US not cancelled our fast reactor program, we would be the world leader in this technology because our technology remains better than any other fourth generation technology in the world.¶ If you delegate this to someone else, nothing will happen. Here’s why.¶ Delegating this letter downward from the White House to someone in DOE to evaluate will result in inaction and no follow up. I know this from past attempts that have been made. It just gets lost and there is no follow up. Every time. The guys at DOE want to do it, but they know that they will get completely stopped by OMB and OSTP. Both Carol Browner and Steven Chu asked former DOE nuclear management what to do about nuclear waste. They were told that using fast reactors and reprocessing was the way to go. But nothing happened. So Chu has given up trying. According to knowledgeable sources, the White House has told DOE in no uncertain terms, “do not build anything nuclear in the US.” It’s not clear who is making these decisions, but many people believe it is being driven by Steven Fetter in OSTP.¶ Dr. Till knows all of this. He knows that unless he personally meets with the President to tell the story of this amazing technology, nothing will happen.¶ I’ve discussed the IFR with Steve Fetter and he has his facts wrong. Fetter is basically a Frank von Hippel disciple: they have written at least 14 papers together! It was von Hippel who was largely responsible for killing the IFR under Clinton.¶ So von Hippel’s misguided thought process is driving White House policy today. That’s a big mistake. Professor von Hippel twists the facts to support his point of view and fails to bring up compelling counter arguments that he knows are true but would not support his position. He’s not being intellectually honest. I’ve experienced this myself, firsthand. For example, von Hippel often writes that fast reactors are unreliable. When I pointed out to him that there are several examples of reliable fast reactors, including the EBR-II which ran for decades without incident, he said, that these were the “exceptions that prove the rule.” I was floored by that. That’s crazy. It only proves that it is complicated to build a fast reactor, but that it can easily be done very reliably if you know what you are doing. There is nothing inherent to the technology that makes it “unreliable.” You just have to figure out the secrets. When von Hippel heard that Congressman Garamendi was supporting the IFR, he demanded a meeting with Garamendi to “set him straight.” But what happened was just the opposite: Garamendi pointed out to von Hippel that von Hippel’s “facts” were wrong. Von Hippel left that meeting with Garamendi with his tail between his legs muttering something about that being the first time he’s ever spoken with anyone in Congress who knew anything about fast nuclear reactors. In short, if you watch a debate between von Hippel and Garamendi (who is not a scientist), Garamendi easily wins on the facts. If you put von Hippel up against someone who knows the technology like Till, Till would crush von Hippel on both the facts and the arguments. But the Clinton White House never invited Till to debate the arguments with von Hippel. They simply trusted what von Hippel told them. Big mistake.¶ There are lots of problems with von Hippel’s arguments. For example, von Hippel ignores reality believing that if the USA doesn’t do something then it will not happen. That’s incredibly naieve and he’s been proven wrong. The USA invented a safe way to reprocess nuclear waste that isn’t a proliferation risk called pyroprocessing. The nuclear material is not suitable for making a bomb at any time in the process. But we never commercialized it because von Hippel convinced Clinton to cancel it. The French commercialized their reprocessing process (PUREX) which separates out pure plutonium and makes it trivial to make bomb material. So because countries need to reprocess, they pick the unsafe technology because they have no alternative. Similarly, because von Hippel had our fast reactor program cancelled, the Russians are the leaders in fast reactor technology. They’ve been using fast reactor technology for over 30 years to generate power commercially. But we know the Russians have a terrible nuclear safety record (e.g., Chernobyl). The fact is that the Chinese are buying fast reactors from the Russians because there is no US alternative. The problem with von Hippel’s arguments are that the genie is out of the bottle. We can either lead the world in showing how we can do this safely, or the world will choose the less safe alternatives. Today, von Hippel’s decisions have made the world less safe. I could go on and on about how bad von Hippel’s advice is, but this letter is already way too long.¶ MIT was wrong in their report about “The Future of the Nuclear Fuel Cycle”¶ The only other seemingly credible argument against building fast reactors now comes from MIT. The report’s recommendation that we have plenty of time to do R&D appears largely to be driven by one person, co-chair Ernie Moniz.¶ Four world-famous experts on nuclear power and/or climate change and one Congressman challenged Moniz to a debate on the MIT campus on his report. Moniz declined.¶ The report has several major problems. Here are a few of them.¶ The MIT report is inconsistent. On the one hand it says, “To enable an expansion of nuclear power, it must overcome critical challenges in cost, waste disposal, and proliferation concerns while maintaining its currently excellent safety and reliability record.” We agree with that! But then it inexplicably says, “… there are many more viable fuel cycle options and that the optimum choice among them faces great uncertainty…. Greater clarity should emerge over the next few decades… A key message from our work is that we can and should preserve our options for fuel cycle choices by …[continuing doing what we are doing today] … and researching technology alternatives appropriate to a range of nuclear energy futures.” So even though we have a solution now that can be deployed so we can enable an expansion of nuclear power as soon as possible, MIT advises that we should spend a few more decades because we might find something better than the IFR. This is just about the dumbest thing I’ve ever heard coming from MIT. If you ask any scientist who knows anything about global warming, they will tell you we are decades late in deploying carbon-free power. Had we aggressively ramped fast nuclear closed-cycle reactors decades ago and promoted them worldwide, we wouldn’t be anywhere close to the disastrous situation we are in today. So we are decades too late in ramping up nuclear power, and Moniz wants us to spend decades doing more R&D to get a solution that might be lower cost than the IFR. That’s insane.¶ The report looks at the market price of uranium, but the market price completely ignores the environmental impacts of uranium mining. Shouldn’t that be taken into account? It’s like the cost of gas is cheap because the market price doesn’t include the hidden costs: the impact on the environment and on our health.¶ Do you really think that people are going to embrace expansion of uranium mining in the US? The MIT report is silent on that. So then we are back to being dependent on other countries for uranium. Wasn’t the whole point to be energy independent? The IFR provides that now. We wouldn’t have to do any uranium mining ever again. After a thousand years, when we’ve used all our existing nuclear waste as fuel, we can extract the additional fuel we need from seawater, making our seas less radioactive. We can do that for millions of years.¶ The MIT report ignores what other countries are doing. Obama wants the US to be a leader in clean energy technology. You do that by building the most advanced nuclear designs and refining them. That’s the way you learn and improve. MIT would have us stuck on old LWR technology for a few decades. Does anyone seriously think that is the way to be the world leader? There is virtually no room for improvement in LWR technology. IFR technology is nearly 100 times more efficient, and it emits no long term nuclear waste. If you are a buyer of nuclear power in China, which nuclear reactor are you going to pick? The one that is 100 times more efficient and generates no waste? Or the one that is 100 times less efficient and generates waste that you better store for a million years? Wow. Now that’s a real tough question, isn’t it. Gotta ponder that one. I’m sure Apple Computer isn’t taking advice from Moniz. If they were, they’d still be building the Apple I. Ernie should get a clue. The reason Apple is a market leader is because they bring the latest technology to market before anyone else, not because they keep producing old stuff and spend decades doing R&D to see if they can come up with something better. Other countries are not hampered by MIT’s report. France and Japan recently entered into an agreement with the US DOE whereby we’re giving them the IFR technology for them to exploit. Even though we are stupid, they aren’t stupid. The Chinese are ordering inferior oxide fueled fast reactors from Russia. If the US were building metal-fueled fast reactors with pyroprocessing, it’s a good bet the Chinese would be buying from us instead of the Russians. But if we take Moniz’s advice to not build the world’s best advanced nuclear technology we already have, then there is no chance of that happening. By the time we get to market with a fast reactor, it will be all over. We’ll arrive to the market decades late. Another great American invention that we blew it on.¶ There will always be new technologies that people will propose. But the IFR is a bird in the hand and we really need a solution now we can depend on. If something comes along later that is better, that’s great. But if it doesn’t, we will have a viable technology. We can’t afford to get this wrong. We have already run out of time. Any new nuclear designs are decades away from deployment.¶ On September 22, 2011, DOE agreed to give MIT $7.5 millions of dollars on starting R&D on a fourth generation molten salt reactor design that have never been proven. While it might work, the very smart scientists at Oak Ridge National Laboratory spent well over a decade on this and were never able to make it work. So DOE is spending millions on an unproven design while spending nothing on the “sure thing” fourth generation reactor that we already know how to build and that ran flawlessly for 30 years. We are all scratching our heads on that one. It makes no sense. But the reason for this is clear: the mandate from the White House that nothing is to built means that DOE can only initiate research, and then cancel the project right before anything would be built. This is an excellent plan for demoralizing scientists and allowing other countries to lead the world in clean energy. Is that really what we want?? If so, then there are much less expensive ways to accomplish that.¶ At a minimum we should be investing in commercializing our “bird in the hand.” That way, if the new molten salt reactor experiments don’t work out, we’ll still have a viable solution to the nuclear waste problem. If we keep cancelling successful projects right before they are done, hoping for the next big thing, we will forever be in R&D mode and get nothing done. That’s where we are today with fourth generation nuclear.¶ I know this is an unusual request, but I also know that if the President is allowed to evaluate the facts first hand, I am absolutely convinced that he will come to the same conclusion as we all have.¶ I urge you to view an 8 minute video narrated by former CBS Morning News anchor Bill Kurtis that explains all of this in a way that anyone can understand. This video can be found at:¶ The video will amaze you.¶ If you would like an independent assessment of what I wrote above from a neutral , trustworthy, and knowledgeable expert, Bill Magwood would be an excellent choice. Magwood was head of nuclear at DOE under Clinton and Bush, and was the longest serving head of nuclear at DOE in US history. He served under both Clinton and Bush administrations. Magwood is familiar with the IFR, but the IFR was cancelled before he was appointed to head civilian nuclear at DOE. So Magwood has no vested interest in the IFR at all. More recently, Magwood was appointed by President Obama to serve on the NRC and is currently serving in that role. Of the current five NRC Commissioners, Magwood is by far, the person most knowledgeable (PMK) about fast reactors.¶ Thank you for your help in bringing this important matter to the President’s attention.¶ Summary¶ Nuclear power is needed. Renewables alone won’t do it.¶ In order to revive nuclear in the US, you must have a viable solution to the nuclear waste problem.¶ The French reprocess their nuclear waste, but their process is expensive, environmentally unfriendly, and has proliferation problems.¶ The USA developed an inexpensive, environmentally friendly, and proliferation resistant method to reprocess our waste (the IFR), but we cancelled it. That decision was a mistake.¶ We should restart the IFR in the US. It will cost $3B to build, but we can cancel the Areva MOX plant and save $10B to pay for it. So we’ll save money, save the planet from an environmental catastrophe, create jobs, get rid of our nuclear waste, and become the world leader in clean energy technology.¶ President Obama should meet personally with Dr. Charles Till, the world’s leading expert on fast reactor technology. Dr. Till will not waste his time meeting with anyone other than the President because he knows that without personal support of the President, nothing will happen. He’s right.¶ Supporters of this technology include Nobel prize winner Hans Bethe (now deceased), Steven Chu, Dr. James Hansen, Dr. Charles Till, Dr. Eric Loewen, Congressman John Garamendi, Bill Gates, and even the President of MIT. Even the board of directors of the historically anti-nuclear Sierra Club has agreed that they will not oppose building an IFR!¶ Opposition is from OSTP and OMB. We don’t know who or why. It’s a mystery to all my sources. Frank von Hippel thinks you cannot make fast reactors cheaply or reliably and maintains that stance even when the facts show that not to be the case. Ernie Moniz at MIT thinks we shouldn’t build anything now, but do more R&D for the next several decades hoping we can find something better.¶ Bill Magwood, an Obama appointee to the NRC, would be a reasonable choice to provide an objective assessment of the IFR. He has no vested interested in the IFR, but having been the longest serving head of DOE civilian nuclear in history, is familiar with the pros and cons of the technology.¶ Should OSTP and OMB be making these key decisions behind closed doors? Is this really reflective of what the President wants? He’s stated publicly he wants the US to be a world leader in clean energy. Is putting our best technology on the shelf, but licensing the French and Japanese to build it (Joint Statement on Trilateral Cooperation in the area of Sodium-cooled Fast Reactors signed on October 4, 2010 by DOE), the best way for the US to achieve the leadership that Obama said he wanted?¶ I am happy to provide you with additional information.

#### IFRs are technologically ready – we just have to decide to build them

Brook 11 (Barry Brook, Professor of Climate Change University of Adelaide, “Nuclear power and climate change – what now?” 5/28/11) <http://bravenewclimate.com/2011/05/28/np-cc-what-now/>

But detractors will nevertheless complain that reactors like the ESBWR still produce long-lived radioactive waste products that will have to be safely watched over for what is, for all intents and purposes, forever (from a human standpoint). Another objection frequently raised is the risk of nuclear proliferation, the fear that nuclear material will be misdirected from power plants and made into nuclear weapons. Fuel supply is also an issue when the prospect of a burgeoning nuclear renaissance is considered, with demand for uranium expected to skyrocket. And over all this looms the capital cost of building nuclear power plants, which many consider a deal-breaker even if all the other issues could be resolved. Back in the early Eighties a group of talented nuclear physicists and engineers realized that if there was to be any reasonable expectation of widespread public acceptance of nuclear power, all these problems would have to be solved. So they set out to solve them. Under the leadership of Dr. Charles Till at Argonne National Laboratory’s western branch in the state of Idaho, a virtual army of nuclear professionals designed an energy system that many expect will soon power the planet, if only we can muster the political will to deploy it. Their test reactor operated virtually flawlessly for thirty years as they identified and solved one potential obstacle after another, proceeding methodically until they were ready to demonstrate the commercial-scale viability of their revolutionary fuel recycling system that would complete what had been a spectacularly successful project. What they had accomplished during those years was, without exaggeration, probably the most important energy system ever invented, one that promises virtually unlimited safe, clean energy for the entire planet. Unfortunately, an almost unbelievable shortsightedness on the part of politicians in Washington D.C. pulled the plug on the project just as it reached its final stage in 1994, and the promise of the Integral Fast Reactor (IFR) languished virtually unnoticed for the next fifteen years. Figure 1: A simplified version of an IFR reactor. Illustration courtesy of Andrew Arthur The Integral Fast Reactor But the IFR is such a grand invention that it couldn’t stay buried any longer, and people around the world are now clamoring for it to be deployed. The looming threat of climate change has prompted many to take a fresh look at nuclear power. Some have considered the problem of so-called “nuclear waste” (not waste at all, as we shall soon see) an acceptable price to pay in order to curtail greenhouse gas emissions. In the wake of the Japan accident, safety will also be prominent in the debate. The IFR, though, is so impressive in its qualifications that even previously hard-core anti-nuclear activists have touted it as the ultimate answer. And the fact that over 300 reactor-years of experience have been accumulated with fast reactors around the world means that such technology is no pipe dream, but a mature technology ripe for commercial deployment. The term Integral Fast Reactor denotes two distinct parts: A sodium-cooled fast neutron fission reactor and a recycling facility to process the spent fuel. A single recycling facility would be co-located with a cluster of reactors. Figure 1 shows a simplified version of such a reactor. It consists of a stainless steel tub of sodium, a metal that liquifies at about the boiling point of water. Sodium is used both as a completely non-corrosive coolant and, in a separate non-radioactive loop, as the heat transfer agent to transport the heat to a steam generator in a separate structure (thus avoiding any possible sodium-water interaction in the reactor structure). The system is unpressurized, and the pumps are electromagnetic pumps with no moving parts. In the event of a loss of flow, natural convection and the large amount of sodium will be sufficient to dissipate the heat from the fission products in the core, unlike the situation in the Japanese reactors at Fukushima, which required constant cooling even though the reactors had been shut off. The commercial-scale iteration of the IFR’s reactor component is called the PRISM (or its slightly larger successor, the S-PRISM, though for the sake of brevity I’ll hereafter call it simply the PRISM, which stands for Power Reactor Innovative Small Module). It was designed by a consortium of American companies in conjunction with Argonne Lab, and is now being further refined by GE/Hitachi Nuclear. From a safety standpoint it is unparalleled. If the risk assessment studies for the ESBWR mentioned above sound impressive, those of the IFR are even better. In my book Prescription for the Planet, I did a thought experiment based on the risk assessment studies for the PRISM that have already gotten a preliminary nod from the NRC. The likelihood of a core meltdown was so improbable that I figured out how often we could expect one if thousands of PRISMs were providing all the energy (not just electricity) that humanity will require a few decades hence (according to most estimates). Remember, the occurrence of one meltdown would require dividing the total number of reactors into the probability for a single reactor. Even so, the probable core meltdown frequency came to once every 435,000 years! Even if that risk assessment was exaggerated by ten thousand times, it would still mean we could expect a meltdown about once every half-century for all the energy humanity needs. Reactors and Natural Disasters The crisis at Fukushima’s power plant has stoked fears that existing nuclear sites may be incapable of withstanding quakes in excess of their design specifications. Whereas many lightwater reactors are designed to withstand G forces of about 0.3, the PRISM is rated at 1.0. This G rating is different than a Richter scale rating because the Richter scale represents the total energy released in an earthquake, which is dependent on many factors (duration, depth, etc.). When designing a structure or piece of equipment to withstand earthquakes, the degree of ground acceleration is what matters. If one were to stand directly on a geological fault line during the most severe earthquake imaginable, the G forces caused by ground acceleration would almost certainly not exceed 1.0. (The maximum ground motion at the Fukushima complex during the earthquake measuring 9.0 on the Richter scale was 0.56 G) So the PRISM reactor, designed for that level of motion, could safely be built in any seismically active area. Of course it goes without saying that no power plant should be built at a low elevation in a zone that is vulnerable to tsunamis, or for that matter on a flood plain. But with the PRISM, seismic shocks are not an issue. As for proliferation risk, it should be pointed out that the risk of proliferation from any sort of power reactor has been substantially mischaracterized and generally overblown. The reason is that the isotopic composition of the uranium and plutonium in power reactors is lousy for making weapons. Any country that wishes to pursue a weapons program covertly is far better served by using a small research reactor operated in a specific manner to produce high-grade weapons material, and even then it requires a quite complex reprocessing system to separate it. That being said, the IFR system uses a unique metal fuel that can not only be easily and cheaply recycled on-site and then fabricated into new fuel elements, but at no stage of the fuel cycle is any sort of weapons-grade material isolated. All the isotopes of uranium and plutonium are not only left mixed with their various cousins, but there is always at least a bit of highly radioactive fission product elements, making the fuel impossible to handle except by remote systems. Figure 2: The fission products will only be radioactive beyond the level of natural ore for a few hundred years. The buildup of such fission products in the fuel, though, is what eventually necessitates pulling fuel elements out of the reactor for recycling. In the pyroprocessing system—a type of electrorefining common in the metallurgical industry but unique to the IFR among reactor systems—the majority of the fission products are isolated. The rest of the fuel is reincorporated into new fuel elements. The fission products, representing only a small percentage of the fuel, are entombed in borosilicate glass that can’t leach any of them into the environment for thousands of years. Yet the fission products will only be radioactive beyond the level of natural ore for a few hundred years (see Figure 2). Thus the so-called “million year waste problem” is neatly solved. As for the question of uranium supply, that issue is moot once we begin to build IFRs. First we’ll use up all the spent fuel that’s been generated over the years by LWRs, plus all the weapons-grade uranium and plutonium from decommissioned nuclear weapons. It’s all perfect for fuel in IFRs. But then when that’s all gone we can fuel them with depleted uranium. There is already so much of it out of the ground from years of nuclear power use that even if we were to supply all the energy humanity is likely to need from just IFRs alone, we’ve got enough fuel already at hand for nearly a thousand years. As efficient as LWRs are in squeezing a huge amount of energy out of a small amount of fuel, fast reactors like the PRISM are about 150 times more efficient. In fact, all the energy a profligate American would be likely to use in a lifetime could be extracted from a piece of depleted uranium the size of half a ping-pong ball. Finally we come to the clincher: the cost. For some reason it supposedly is going to cost anywhere from two to five times as much to build a nuclear power plant in the USA than exactly the same design being built in the Far East. This comparison applies not just to countries with low labor costs but to Japan too, where labor costs are high and nearly all the materials are imported. It’s an American societal and political problem, not an inherent flaw of nuclear power. Utility companies fear that a group of protesters with signs and lawyers might shut down construction midway through a multi-billion-dollar project, or prevent a built reactor from operating. So they prudently try to build that uncertainty into their cost estimates (with maybe a little padding to boot). A golf ball of uranium would provide more than enough energy for your entire lifetime, including electricity for homes, vehicles and mobile devices, synthetic fuels for vehicles (including tractors to produce your food and jet fuel for your flights). Your legacy? A soda can of fission product was, that would be less radioactive than natural uranium ore in 300 years. The new reactor designs, both the Gen III+ designs mentioned earlier and the PRISM, are designed to be mass-produced in modules, then assembled at the power plant site. The PRISM has the added advantage of operating at atmospheric pressure, so no pressure vessel or high-pressure pumps are needed. The passive safety principles mean that multiple redundancy is unnecessary, allowing such reactors to have far fewer pumps, valves, controls, and other components than their older Gen II predecessors. Based on both industry estimates and actual experience of building these reactors since the Nineties, there is every reason to believe that the price can be kept well below $2,000/kW, though the Chinese plan to produce them for half that price once their mass production supply lines are in place. There is virtually no doubt that with these new nuclear technologies available, the shift to predominantly nuclear power is virtually inevitable in the long term. Over sixty new plants are under construction around the world with many more to come, even if some nations are temporarily deterred by political and social pressures. If we’re serious about solving the climate change problem before it’s too late, we’ll have to get serious about the only zero-emission baseload power source that can easily supply all the energy the world needs. We shouldn’t consider this a Faustian bargain. These new designs—particularly the IFR—are clean, safe, economical, and able to convert waste products that we desperately want to get rid of into abundant energy for the entire planet. Anyone serious about protecting the environment can safely embrace them with enthusiasm.

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### AT: Energy K

#### State focused nuclear power solutions key – solves their impact better

Nordhaus 11, chairman – Breakthrough Instiute, and Shellenberger, president – Breakthrough Insitute, MA cultural anthropology – University of California, Santa Cruz, 2/25/‘11

(Ted and Michael, <http://thebreakthrough.org/archive/the_long_death_of_environmenta>)

Tenth, we are going to have to get over our suspicion of technology, especially nuclear power. There is no credible path to reducing global carbon emissions without an enormous expansion of nuclear power. It is the only low carbon technology we have today with the demonstrated capability to generate large quantities of centrally generated electrtic power. It is the low carbon of technology of choice for much of the rest of the world. Even uber-green nations, like Germany and Sweden, have reversed plans to phase out nuclear power as they have begun to reconcile their energy needs with their climate commitments. Eleventh, we will need to embrace again the role of the state as a direct provider of public goods. The modern environmental movement, borne of the new left rejection of social authority of all sorts, has embraced the notion of state regulation and even creation of private markets while largely rejecting the generative role of the state. In the modern environmental imagination, government promotion of technology - whether nuclear power, the green revolution, synfuels, or ethanol - almost always ends badly. Never mind that virtually the entire history of American industrialization and technological innovation is the story of government investments in the development and commercialization of new technologies. Think of a transformative technology over the last century - computers, the Internet, pharmaceutical drugs, jet turbines, cellular telephones, nuclear power - and what you will find is government investing in those technologies at a scale that private firms simply cannot replicate. Twelveth, big is beautiful. The rising economies of the developing world will continue to develop whether we want them to or not. The solution to the ecological crises wrought by modernity, technology, and progress will be more modernity, technology, and progress. The solutions to the ecological challenges faced by a planet of 6 billion going on 9 billion will not be decentralized energy technologies like solar panels, small scale organic agriculture, and a drawing of unenforceable boundaries around what remains of our ecological inheritance, be it the rainforests of the Amazon or the chemical composition of the atmosphere. Rather, these solutions will be: large central station power technologies that can meet the energy needs of billions of people increasingly living in the dense mega-cities of the global south without emitting carbon dioxide, further intensification of industrial scale agriculture to meet the nutritional needs of a population that is not only growing but eating higher up the food chain, and a whole suite of new agricultural, desalinization and other technologies for gardening planet Earth that might allow us not only to pull back from forests and other threatened ecosystems but also to create new ones. The New Ecological Politics The great ecological challenges that our generation faces demands an ecological politics that is generative, not restrictive. An ecological politics capable of addressing global warming will require us to reexamine virtually every prominent strand of post-war green ideology. From Paul Erlich's warnings of a population bomb to The Club of Rome's "Limits to Growth," contemporary ecological politics have consistently embraced green Malthusianism despite the fact that the Malthusian premise has persistently failed for the better part of three centuries. Indeed, the green revolution was exponentially increasing agricultural yields at the very moment that Erlich was predicting mass starvation and the serial predictions of peak oil and various others resource collapses that have followed have continue to fail. This does not mean that Malthusian outcomes are impossible, but neither are they inevitable. We do have a choice in the matter, but it is not the choice that greens have long imagined. The choice that humanity faces is not whether to constrain our growth, development, and aspirations or die. It is whether we will continue to innovate and accelerate technological progress in order to thrive. Human technology and ingenuity have repeatedly confounded Malthusian predictions yet green ideology continues to cast a suspect eye towards the very technologies that have allowed us to avoid resource and ecological catastrophes. But such solutions will require environmentalists to abandon the "small is beautiful" ethic that has also characterized environmental thought since the 1960's. We, the most secure, affluent, and thoroughly modern human beings to have ever lived upon the planet, must abandon both the dark, zero-sum Malthusian visions and the idealized and nostalgic fantasies for a simpler, more bucolic past in which humans lived in harmony with Nature.

#### Focus on individual consumption leads to socially regressive solutions – re-inscribe inequality

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Martens, S. & Spaargaren, G. 2005. The politics of sustainable consumption: the case of the Netherlands. Sustainability: Science, Practice, & Policy 1(1):29-42. Proquest

We begin with a discussion of the possible weaknesses inherent in more consumption-oriented environmental policies, and consider the “individualization” of politics and political responsibilities as developed by Bauman (1993) and Princen et al. (2002). Many environmental problems are ultimately rooted in the conduct of institutional actors, such as companies and governments. Under these circumstances, there is little merit imposing obligations on citizen-consumers, who not only lack the power to influence the organization of production and consumption, but also cannot—and arguably should not—be held responsible for issues that arise out of the “treadmill of production and consumption” (Schnaiberg, 1980). It is likely to be unproductive, and above all illegitimate, to burden citizen-consumers with remedying such problems. If policy initiatives only advance individual solutions—and ignore institutional actors—socially regressive and environmentally ineffectual outcomes will be the result.

#### Consumption-only focus fails – ignores production-oriented environmental degradation

Holmes 7 (Dave, “A socialist view of global warming: change the system, not the climate!”, Google Books, accessed: 6/26/12)//AMV

Such views among genuine environmental activists reflect a well-meaning but ultimately utopian belief that if only enough of us decide to drastically reduce our demand on the world’s resources — via greatly reduced personal consumption, purchasing from firms with sustainable production techniques and non-polluting technologies — big business and governments will respond to “market signals” and accept and adapt to a slow-growth or no-growth economy. Of course, we should not dismiss the importance of environmental consciousness and radicalisation, which is often expressed in attempts to live in ways consistent with sustainability. It is a good thing if people try to organise their lives so that they live more ecologically. But we have to be clear that that alone will not be enough to halt the crisis. It certainly cannot be the main strategy of the mass environment movement, as it will let the real culprits off the hook and divert precious activist energy away from the underlying systemic dynamic that is driving ecological degradation. As Marxist ecologist John Bellamy Foster explained in a very useful and accessible article published in the Monthly Review magazine in February 1995,6 behind most appeals for individual “ecological morality”, “there lies the presumption that we live in a society where the morality of the individual is the key to the morality of society. If people as individuals could simply change their moral stance with respect to nature and alter their behaviour in areas such as propagation, consumption, and the conduct of business, all would be well.” However, Foster continues: “What is all too often overlooked in such calls for moral transformation is the central institutional fact of our [capitalist] society: what might be called the global ‘treadmill of production’.”

#### Democracy checks

**O’Kane 97 –** Prof Comparative Political Theory, U Keele (Rosemary, “Modernity, the Holocaust and politics,” Economy and Society 26:1, p 58-9, AG)

Modern bureaucracy is not 'intrinsically capable of genocidal action' (Bauman 1989: 106). Centralized state coercion has no natural move to terror. In the explanation of modern genocides it is chosen policies which play the greatest part, whether in effecting bureaucratic secrecy, organizing forced labour, implementing a system of terror, harnessing science and technology or introducing extermination policies, as means and as ends. As Nazi Germany and Stalin's USSR have shown, furthermore, those chosen policies of genocidal government turned away from and not towards modernity. The choosing of policies, however, is not independent of circumstances. An analysis of the history of each case plays an important part in explaining where and how genocidal governments come to power and analysis of political institutions and structures also helps towards an understanding of the factors which act as obstacles to modern genocide. But it is not just political factors which stand in the way of another Holocaust in modern society. Modern societies have not only pluralist democratic political systems but also economic pluralism where workers are free to change jobs and bargain wages and where independent firms, each with their own independent bureaucracies, exist in competition with state-controlled enterprises. In modern societies this economic pluralism both promotes and is served by the open scientific method. By ignoring competition and the capacity for people to move between organizations whether economic, political, scientific or social, Bauman overlooks crucial but also very 'ordinary and common' attributes of truly modern societies. It is these very ordinary and common attributes of modernity which **stand in the way of modern genocides.**

franca and world currency (Adorno 1964/1973 1973).

#### Prefer util

Cummiskey 90 – Professor of Philosophy, Bates (David, Kantian Consequentialism, Ethics 100.3, p 601-2, p 606, jstor, AG)

We must not obscure the issue by characterizing this type of case as the sacrifice of individuals for some abstract "social entity." It is not a question of some persons having to bear the cost for some elusive "overall social good." Instead, the question is whether some persons must bear the inescapable cost for the sake of other persons. Nozick, for example, argues that "to use a person in this way does not sufficiently respect and take account of the fact that he is a separate person, that his is the only life he has."30 Why, however, is this not equally true of all those that we do not save through our failure to act? By emphasizing solely the one who must bear the cost if we act, one fails to sufficiently respect and take account of the many other separate persons, each with only one life, who will bear the cost of our inaction. In such a situation, what would a conscientious Kantian agent, an agent motivated by the unconditional value of rational beings, choose? We have a duty to promote the conditions necessary for the existence of rational beings, but both choosing to act and choosing not to act will cost the life of a rational being. Since the basis of Kant's principle is "rational nature exists as an end-in-itself' (GMM, p. 429), the reasonable solution to such a dilemma involves promoting, insofar as one can, the conditions necessary for rational beings. If I sacrifice some for the sake of other rational beings, I do not use them arbitrarily and I do not deny the unconditional value of rational beings. **Persons** may **have "dignity**, an unconditional and incomparable value" that transcends any market value (GMM, p. 436), **but**, as rational beings, persons **also** have **a fundamental equality which dictates that some must** sometimes **give way for the sake of others.** The formula of the end-in-itself thus does not support the view that we may never force another to bear some cost in order to benefit others. If one focuses on the equal value of all rational beings, then equal consideration dictates that one sacrifice some to save many. [continues] According to Kant, the objective end of moral action is the existence of rational beings. Respect for rational beings requires that, in deciding what to do, one give appropriate practical consideration to the unconditional value of rational beings and to the conditional value of happiness. Since agent-centered constraints require a non-value-based rationale, the most natural interpretation of the demand that one give equal respect to all rational beings lead to a consequentialist normative theory. We have seen that there is no sound Kantian reason for abandoning this natural consequentialist interpretation. In particular, a consequentialist interpretation does not require sacrifices which a Kantian ought to consider unreasonable, and it does not involve doing evil so that good may come of it. It simply requires an uncompromising commitment to the equal value and equal claims of all rational beings and a recognition that, in the moral consideration of conduct, one's own subjective concerns do not have overriding importance.

### 2AC Russia

#### Russian econ is resilient – budget flexibility, reserve funds, and falling ruble check total collapse

Jason Bush 7-2-2012; Reuters columnist, Oil-price slide highlights risks to Putin's Russia http://articles.economictimes.indiatimes.com/2012-07-02/news/32508636\_1\_oil-price-largest-oil-producer-peter-westin

Analysts say the impact on Russia of lower oil prices may be milder than during previous falls. "In the short term, in the next one to three years, we are fine," said Tchakarov. He noted that according to Finance Ministry calculations, every one dollar fall in the oil price means that the government loses around 55 billion roubles ($1.7 billion) in oil-related taxes over the course of a year. With the budget presently balancing at around $115 per barrel, an oil price of $90 per barrel, if sustained over a full year, would leave the government short to the tune of around $40 billion a year. But that is still just a fraction of the $185 billion that Russia has stashed away in two fiscal reserve funds, designed to stabilise the budget in just such an emergency. Even at $60 per barrel - the average oil price during the crisis year of 2009 - the reserve funds could cover the shortfall for about two years. "I find this worrying about the budget at this moment a little beside the point," said Clemens Grafe, chief Russia economist at Goldman Sachs. "The fiscal buffers they have to absorb this are going to be sufficient without cutting expenditure." Analysts also point out that since the previous financial crisis in 2008-2009, the central bank has radically changed the exchange rate regime, allowing the rouble to fall in line with the cheaper oil price. Since oil began its latest slide in mid-March, the rouble has lost around 15 percent of its value against the dollar. "The rouble weakened exactly in line with the oil price. And a weaker rouble is very good because it will secure the rouble equivalent of oil taxes for the budget," said Evgeny Gavrilenkov, chief economist at Troika Dialog.

#### Corruption inevitably crushes growth – and no short-term reforms will pass or be effectively implemented

Alexei Devyatov 6-15-2011; Chief Economist at URALSIB Capital, “ Russia Economy 2H11 Outlook: Reduced Impact of Oil on Russian Economic Growth” <http://www.bne.eu/story2735/Reduced_Impact_of_Oil_on_Russian_Economic_Growth>

We expect the Russian economy to grow about 4% on average in 2011-13 and starting from 2014, at 2-4%. Russia is an extremely interesting case. On the one hand, it has huge human capital and abundant natural resources. On the other hand, there is a lack of opportunities for transforming that potential into strong economic growth and prosperity. The main obstacles are an uncompetitive economy, an addiction to oil; poor demographics; weak institutions; and as a consequence, a poor investment climate. Administrative barriers make it more difficult for entrepreneurs to enter the market, which reduces competition and results in higher prices. The businesses suffer from pervasive corruption, which has effectively turned into unofficial tax burden in Russia. To attain rapid economic growth and prosperity, Russia needs to drastically improve its institutions, which means removing an entire class of corrupt officials. Unfortunately, over the last ten years, little has changed in terms of the quality of institutions, not least because those interested in maintaining the status quo have sufficient power to effectively block the reforms. Still we see the potential for gradual institutional changes as the government intensifies its efforts to fight corruption, to improve investment climate, and to modernize the economy

#### No impact to Russian economy

Blackwill, 09 – former associate dean of the Kennedy School of Government and Deputy Assistant to the President and Deputy National Security Advisor for Strategic Planning (Robert, RAND, “The Geopolitical Consequences of the World Economic Recession—A Caution”, http://www.rand.org/pubs/occasional\_papers/2009/RAND\_OP275.pdf, WEA)

Now on to Russia. Again, five years from today. Did the global recession and Russia’s present serious economic problems substantially modify Russian foreign policy? No. (President Obama is beginning his early July visit to Moscow as this paper goes to press; nothing fundamental will result from that visit). Did it produce a serious weakening of Vladimir Putin’s power and authority in Russia? No, as recent polls in Russia make clear. Did it reduce Russian worries and capacities to oppose NATO enlargement and defense measures eastward? No. Did it affect Russia’s willingness to accept much tougher sanctions against Iran? No. Russian Foreign Minister Lavrov has said there is no evidence that Iran intends to make a nuclear weapon.25 In sum, Russian foreign policy is today on a steady, consistent path that can be characterized as follows: to resurrect Russia’s standing as a great power; to reestablish Russian primary influence over the space of the former Soviet Union; to resist Western eff orts to encroach on the space of the former Soviet Union; to revive Russia’s military might and power projection; to extend the reach of Russian diplomacy in Europe, Asia, and beyond; and to oppose American global primacy. For Moscow, these foreign policy first principles are here to stay, as they have existed in Russia for centuries. 26 None of these enduring objectives of Russian foreign policy are likely to be changed in any serious way by the economic crisis.

#### Link turn

**Timbers 3** William Timbers president and CEO of the USEC, explains in 2k3: Timbers, President and Chief Executive Officer USEC Inc, 9-19-2k3

(William, "Nuclear Power & Global Security: Mutual Interest, Mutual Opportunities, Delivered at the Carnegie Endowment for International

Peace Second International Non-Proliferation Conference Moscow, Russia. P. <http://www.usec.com/v2001_02/Content/News/Speeches/09-19-03-CEIPMoscowRe>marks.pdf )

While significant steps have been taken by Russia and the United States to strengthen the security of stored fissionable nuclear materials, a different approach goes right to the heart of the matter—the very elimination of nuclear warhead materials.

After several years of consultations, in 1993 Russia and the United States formally agreed to a 20-year, $12 billion program to eliminate 500 metric tons of highly enriched uranium (HEU) taken from dismantled Russian warheads. To put this in perspective, 500 metric tons of HEU is the equivalent of more than 20,000 nuclear warheads. This U.S.-Russian agreement is often referred to it as the “HEU-LEU” agreement or “the Russian HEU Agreement.” We, who are responsible for commercially implementing this agreement, call it the “Megatons to Megawatts” program. I want to take a moment to acknowledge that, over the years, many of you—both Russians and Americans—have played a vital role in making this HEU to LEU program possible and in helping to ensure its continuity. You can be justifiably proud of your role in making this remarkable effort a success. For those of you who are not familiar with Megatons to Megawatts, you may be wondering why a private sector company is involved. That is because the 1993 U.S.-Russian Agreement requires that it be implemented strictly on commercial terms. Simply put, the strategy of the two governments was to ensure that a substantial amount of excess weapons material was irreversibly converted to peaceful uses as quickly as possible and to utilize the dynamics of the commercial market for nuclear fuel to pay for this effort. Their accurate assessment was that the program could commercially sustain itself over the 20-year period through the sale and purchase of fuel derived from warhead materials. Accordingly, in 1994 executive agents appointed by both governments signed a commercial implementing contract—Techsnabexport (TENEX) acting for the Russian government and the United States Enrichment Corporation (USEC) acting for the United States government. The value of this program also extends beyond its basic mission of eliminating nuclear warhead materials. There is also a human dimension. Proceeds from this program support thousands of Russian workers who take part in the process of transforming HEU into reactor fuel, who work on environmental cleanup and restoration and who enhance the safeguards for these materials. This underscores the importance of addressing issues concerning highly talented people who were previously involved in weapons programs. The talents of these dedicated scientists and engineers, representing a broad range of technical capabilities, can and should be utilized for non-weapons related work. Companies such as USEC stand ready to work with their Russian partners to facilitate and accelerate such endeavors. 2 When you consider the achievements of the Nunn-Lugar and Megatons to Megawatts programs and the human resources implications, it is clear that they have made a definite contribution to reducing the threat of nuclear weapons. But, what about the future? I believe that we can substantially increase the amount of nuclear warhead material that is eliminated by burning it as fuel in a new generation of commercial nuclear power stations. Regardless of where this bomb-grade material may come from, **its conversion into fuel will end its military value.** And last, but not least, the private sector can play a financial and facilitating role in making this happen. Today, the nuclear fuel market is in balance—supply is matching demand. A rapid increase in the number of nuclear power plants would increase the demand for nuclear fuel. While we would meet long-term demand primarily with expanded enrichment capacity, this new demand would also enable accommodation of additional fuel derived from nuclear warhead material. The good news is that we are at an intersection of mutual interests. It is increasingly evident that a global expansion of commercial nuclear power operations is being actively considered—especially in Russia, Asia and the United States. Several events are driving this trend. Events, such as increasing worldwide demand for electricity, power shortages, and global climate change, air pollution and growing dependency upon long, fragile lifelines of energy resources, are increasing the appeal of nuclear power. These factors present us with a unique opportunity. I believe there is a mutual interest among those who advocate the expansion of commercial nuclear power plants and those who seek to eliminate nuclear weapons materials. Advocates of nuclear nonproliferation can accelerate the increased elimination of nuclear bomb-grade materials and secure the dynamics of the marketplace to facilitate these activities Concerns about proliferation are often raised by those opposed to the further development of nuclear power. At the same time, it is widely recognized that there are numerous technical routes to produce nuclear warhead materials and that commercial nuclear power operations, with appropriate and rigorous fuel safeguards, is not the route of choice for those intent on securing weapons materials.

### ANL Funding CP

#### Demonstration projects are key to motivate scientist recruitment – salaries can be adjusted regardless of funding

**National Acadamies Press 12** [2012, Improving the Recruitment, Retention, and Utilization of Federal Scientists and Engineers: A Report to the Carnegie Commision on Science, Technology and Government, <http://www.nap.edu/openbook.php?record_id=2102&page=37>]

There have been no significant changes in NIST's workforce quality indicators—undergraduate grade-point averages, quality of graduate schools, and performance appraisal ratings—which traditionally have been high. Turnover rates, already very low, have not changed,¶ although surveys of leavers indicate that salary has become a less important reason for leaving. Department of Agriculture Demonstration The committee also heard presentations by officials from the U.S. Department of Agriculture (USDA) and its Agricultural Research Service (ARS) about a personnel demonstration project begun in mid-1990 in 140 experimental and 70 comparison sites of the Forest Service and the ARS. The project is largely a testing of a comprehensive simplification and decentralization of the hiring system, but it does include recruitment bonuses and relocation expenses and use of an extended probationary period for scientists in research positions.14 The committee heard that the recruitment incentives have been rarely used, although they were important in attracting a microbiologist and a plant physiologist. It is too early to evaluate the results of the longer probationary period on the retention and productivity of research scientists. Lessons While they are only quasi-experiments, and they do not measure the effects of the interventions on organizational effectiveness, other effects of the various interventions have been measured, the Navy and NIST demonstration projects are consistent with the proposition that a more flexible pay and position structure improves the ability of federal agencies to recruit more qualified scientists and engineers and to reward and motivate good performers and thus retain them. They also show that the direct cost of such efforts is modest, in part because the agencies can (and do, because of budget constraints) tailor the compensation package to each case rather than increase salaries across the board. In addition, the differences among the demonstrations designed by each agency to 14 The extended probationary period does not apply to foresters and other scientists not in research positions.¶ OCR for page 56¶ Improving the Recruitment, Retention, and Utilization of Federal Scientists and Engineers: A Report to the Carnegie Commision on Science, Technology and Government meet its needs show that the various mechanisms can and should be adapted to the particular conditions facing each agency. Thus the agencies faced with implementing FEPCA should consider it an opportunity to design their own recruitment and retention programs. Unfortunately, FEPCA does not include all the devices and flexibilities being used by the demonstration projects. Additional steps needed beyond FEPCA to improve the federal government's capacity to recruit well-qualified scientific and technological personnel are recommended in the last chapter. First, the next chapter discusses the flexibilities offered under FEPCA to agencies faced with attracting and keeping well-qualified scientists and engineers and identifies potential obstacles to effective implementation of FEPCA.

### Science Diplomacy Add-on

#### US federal nuclear leadership is key to science diplomacy

**AAAS ‘8** ((American Association for the Advancement of Science, 10 July 2008, “Energy Expert Calls on United States to Take Leadership in Nuclear Energy Framework”, <http://www.aaas.org/news/releases/2008/0710nuclear_energy.shtml>, [Miller])

**The** next U.S. **president will have a historic opportunity to exercise leadership in** increasing the global investment in **nuclear** technology**, energy expert Victor Reis said** at a AAAS briefing. But the stakes are higher than just finding an alternative to the rising price of oil and coal. Reis, a senior advisor to Secretary of Energy Samuel W. Bodman, said that a well-designed nuclear energy framework could drive global growth by bringing affordable, reliable energy to the developing world, address climate change through clean energy production, and promote international security by securing nuclear materials around the world. **"By increasing the civilian nuclear enterprise, the** next U.S. **president can make use of a historic opportunity to simultaneously attack the biggest interlocking issues that society will face for the next 50 years**," said Reis. Speaking at AAAS headquarters in Washington, D.C., Reis said that around 1.6 billion people, or 25% of the world's population, live without access to electricity and 2.4 billion, or 35%, rely on traditional, carbon-rich biomass like wood for their energy needs because they have no access to modern fuels. Because experts have found a strong correlation between electricity use and almost every statistic for quality of life including life expectancy, literacy, education, and gross domestic product per capita, Reis said, it is imperative that developed nations bring power to the world's neediest citizens. In addition to being an effective technology to meet the future energy needs of the developing world, Reis said that nuclear power generation is better for the environment because it does not release carbon dioxide into the atmosphere. In order to meet a conservative target of maintaining atmospheric carbon dioxide levels below 550 parts per million—a goal echoed in a 2008 report by the Intergovernmental Panel on Climate Change—while still fulfilling the world's energy needs, Reis says that governments must invest heavily in nuclear technology. "A lot of people around the world don't have access to electricity, and you don't want them to burn carbon-rich sources like coal," said Reis, adding that he doesn't see "how you can realistically address climate change without nuclear power." Reis said he is encouraged that many politicians, including those running for president, recognize climate change as among the most pressing issues for their first term in office. Sponsored by the AAAS Center for Science, Technology, and Security Policy, the 2 June briefing on nuclear energy brought together scientists, policy makers, students, and the media. At the event, Benn Tannenbaum, the Center's associate program director, said that he has noticed an increasing amount of opinion and commentary articles on nuclear technology in the nation's largest newspapers, suggesting that it is becoming a heavily discussed issue. "Nuclear energy has tremendous implications for the coming century," said Tannenbaum. "It's absolutely that vital that policy makers make informed decisions with the help of scientists to determine if and how nuclear energy programs move forward. The stakes are incredibly high." Reis said that regardless of U.S. domestic plans to increase nuclear energy production, a widespread global initiative to generate electricity using nuclear power is already underway. Around the world, there are already 439 nuclear reactors in 31 countries, representing 16% of the world's total electricity production. In the United States alone, there are 104 reactors representing 20% of domestic electricity production. Reis added that there are around 93 nuclear power-generating facilities on order or planned globally. He pointed out, however, that there are many challenges to increasing nuclear power around the world, most notably ensuring that radioactive materials used in nuclear power production are not obtained by terrorists or rogue states. One controversial solution announced in 2006 by the administration of U.S. President George W. Bush is the Global Nuclear Energy Partnership (GNEP), an international agreement that has been signed by 21 nations including the United States, the United Kingdom, Russia, China, and France. Under GNEP, the United States and other nations with advanced civilian nuclear energy production facilities would be responsible for safely reprocessing spent nuclear fuel from energy production and then would export it to be reused for other nations' energy programs. This would reduce the number of nuclear enrichment and reprocessing sites around the world, Reis said. He said that the Reliable Replacement Warhead (RRW) program, announced by Bush in 2004, would also help to significantly reduce the overall number of weapons in the U.S. nuclear arsenal while modernizing their design. Weapons experts believe that this may encourage other nations including Russia to reduce their stockpiles. While some experts like former Secretaries of State George P. Shultz and Henry A. Kissinger suggest that nations should aim to achieve a nuclear weapons-free world, others such as former Secretary of Defense Harold Brown and former Director of Central Intelligence John Deutch believe that it is an unreasonable goal and poor policy. Beyond the proliferation of enriched nuclear material, many critics of nuclear power production in the United States fear the increased amount of toxic materials that need to be transported from the reactors to storage after they are used. Reis said he understood those concerns but pointed to the 100 million miles of safe travel that the Department of Energy has overseen for the nation's nuclear weapons and energy materials. He said the same procedures can be applied to commercial nuclear energy. In addition, many nuclear power critics fear the consequences of reactor accidents like the 1986 Chernobyl accident in the Soviet Union and the 1979 Three Mile Island accident near Harrisburg, Pennsylvania. Reis once again pointed out the globe's "remarkable" safety record during more than 12,000 reactor-years of operation with significant improvements made to world's nuclear infrastructure following the incidents. The Three Mile Island incident caused no documented injuries and led to important improvements in U.S. and global safety operations, he said. He added that the Chernobyl disaster involved a reactor that was poorly designed and did not have sufficient containment, which lead to a new generation of reactors with higher safety specifications. Another significant issue with nuclear energy production is where to store the radioactive materials. One controversial proposal is to transport all waste to the Yucca Mountain Repository, a geological storage facility1000 feet deep in the Nevada desert. While the plan has its advantages, such as the ability to retrieve the materials after they are deposited, Reis said that many find the program "geographically unfair" because it makes one region assume the entire burden of the nation's nuclear waste. Regardless of the decision to increase nuclear energy production over the coming decades, Reis said that the Department of Energy (DOE) is able and ready to meet the new challenges of the 21st Century. With over 12,440 Ph.D. scientists, 25,000 visiting scientists, and 17 laboratories across the country, Reis said that **the DOE laboratories "represent one of the biggest scientific collections in the world [and] maybe in the history of civilization."** Beyond access to some of the **top scientific minds and computers** in the world, Reis highlighted several major DOE achievements including **maintaining six top research facilities**, certifying the U.S. nuclear weapons arsenal without underground testing, **helping other nations** secure their nuclear materials, and cleaning up the Rocky Flats weapons production facility and helping convert it into a wildlife refuge. In addition, Reis said that the DOE has nine years of successful operation of its Waste Isolation Pilot Plant (WIPP). Located in Carlsbad, New Mexico, the facility is an underground radioactive waste repository serving as a frontrunner for the Yucca Mountain site. "**Because of the implications of nuclear energy, good or bad, it is important that the** next **administration seize the opportunity for global leadership by using the Department of Energy's world leading assets**," Reis said. Reis added that **the nuclear enterprise could become a vehicle for international cooperation**, echoing a December 1953 speech by U.S. President Dwight D. Eisenhower in which he pledged to devote the nation's "entire heart and mind to find the way by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to his life."

#### Science diplomacy accesses every impact

**Fedoroff ‘8** (Nina, Science and Technology Advisor to the Secretary of State, “Making Science Diplomacy more Effective”, Testimony before the House Science Subcommittee on Research and Science Education, 4-2, <http://legislative.nasa.gov/hearings/4-2-08%20Fedoroff.pdf>)

**Science by its nature facilitates diplomacy because it strengthens political relationships, embodies powerful ideals, and creates opportunities** for all. The global scientific community embraces principles Americans cherish: transparency, meritocracy, accountability, the objective evaluation of evidence, and broad and frequently democratic participation. Science is inherently democratic, respecting evidence and truth above all. Science is also a common global language, able to bridge deep political and religious divides. Scientists share a common language. Scientific interactions serve to keep open lines of communication and **cultural understanding**. As scientists everywhere have a common evidentiary external reference system, members of ideologically divergent societies can use the common language of science to cooperatively address both domestic and the increasingly trans-national and global problems confronting humanity in the 21st century. There is a growing recognition that science and technology will increasingly drive the successful economies of the 21st century. Science and technology provide an immeasurable benefit to the U.S. by bringing scientists and students here, especially from developing countries, where they see democracy in action, make friends in the international scientific community, become familiar with American technology, and contribute to the U.S. and global economy. For example, in 2005, over 50% of physical science and engineering graduate students and postdoctoral researchers trained in the U.S. have been foreign nationals. Moreover, many foreign-born scientists who were educated and have worked in the U.S. eventually progress in their careers to hold influential positions in ministries and institutions both in this country and in their home countries. They also contribute to U.S. scientific and technologic development: According to the National Science Board`s 2008 Science and Engineering Indicators, 47% of full-time doctoral science and engineering faculty in U.S. research institutions were foreign-born. Finally, some types of science - particularly those that address the grand challenges in science and technology - are inherently international in scope and collaborative by necessity. The ITER Project, an international fusion research and development collaboration, is a product of the thaw in superpower relations between Soviet President Mikhail Gorbachev and U.S. President Ronald Reagan. This reactor will harness the power of nuclear fusion as a possible new and viable energy source by bringing a star to earth. ITER serves as a symbol of international scientific cooperation among key scientific leaders in the developed and developing world - Japan, Korea, China, E.U., India, Russia, and United States - representing 70% of the world`s current population. The recent elimination of funding for FY08 U.S. contributions to the ITER project comes at an inopportune time as the Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project had entered into force only on October 2007. The elimination of the promised U.S. contribution drew our allies to question our commitment and credibility in international cooperative ventures. More problematically, it jeopardizes a platform for reaffirming U.S. relations with key states. It should be noted that even at the height of the cold war, the United States used science diplomacy as a means to maintain communications and avoid misunderstanding between the world`s two nuclear powers - the Soviet Union and the United States. In a complex multi-polar world, relations are more challenging, the threats perhaps greater, and the need for engagement more paramount. Using Science Diplomacy to Achieve National Security Objectives The welfare and stability of countries and regions in many parts of the globe require[s] a concerted effort by the developed world to address the causal factors that render countries fragile and cause states to fail. Countries that are unable to defend their people against starvation, or fail to provide economic opportunity, are susceptible to extremist ideologies, autocratic rule, and abuses of human rights. As well, the world faces common threats, among them **climate change, energy and water shortages, public health emergencies, environmental degradation, poverty, food insecurity, and religious extremism**. These threats can undermine the national security of the United States, both directly and indirectly. Many are blind to political boundaries, **becoming regional or global threats**. The United States has no monopoly on knowledge in a globalizing world and the scientific challenges **facing humankind** are enormous. Addressing these common challenges demands common solutions and necessitates **scientific cooperation**, common standards, and common goals. We must increasingly harness the power of American ingenuity in science and technology through strong partnerships with the science community in both academia and the private sector, in the U.S. and abroad among our allies, to advance U.S. interests in foreign policy. There are also important challenges to the ability of states to supply their populations with sufficient food. The still-growing human population, rising affluence in emerging economies, and other factors have combined to create unprecedented pressures on global prices of staples such as edible oils and grains. Encouraging and promoting the use of contemporary molecular techniques in crop improvement is an essential goal for US science diplomacy. An essential part of the war on terrorism is a war of ideas. The creation of economic opportunity can do much more to combat the rise of fanaticism than can any weapon. The war of ideas is a war about rationalism as opposed to irrationalism. Science and technology put us firmly on the side of rationalism by providing ideas and opportunities that improve people`s lives. We may use the recognition and the goodwill that science still generates for the United States to achieve our diplomatic and developmental goals. Additionally, the Department continues to use science as a means to reduce the proliferation of the weapons` of mass destruction and prevent what has been dubbed `brain drain`. Through cooperative threat reduction activities, former weapons scientists redirect their skills to participate in peaceful, collaborative international research in a large variety of scientific fields. In addition, new global efforts focus on improving **biological**, chemical, and **nuclear security** by promoting and implementing **best scientific practices as a means to enhance security, increase global partnerships, and create sustainability.**

### Loose Nukes Add-on

#### Spent nuclear fuel is dangerously exposed in the status quo – only fast reactors solve

**Pearce 12** [Fred Pearce, reporter on environmental issues for over 20 years, environmental correspondent for the New Scientist and The Guardian, 7-30-2012, "Are fast-breeder reactors the answer to our nuclear waste nightmare?"]

None of it yet has a home. If not used as a fuel, it will need to be kept isolated for thousands of years to protect humans and wildlife. Burial deep underground seems the obvious solution, but nobody has yet built a geological repository. Public opposition is high — as successive U.S. governments have discovered whenever the burial ground at Yucca Mountain in Nevada is discussed — and the cost of construction will be huge. So the idea of building fast reactors to eat up this waste is attractive — especially in Britain, but also elsewhere.¶ Theoretically at least, fast reactors can keep recycling their own fuel until all the plutonium is gone, generating electricity all the while. Britain's huge plutonium stockpile makes it a vast energy resource. David MacKay, chief scientist at the Department of Energy and Climate Change, recently said British plutonium contains enough energy to run the country's electricity grid for 500 years.¶ Fast reactors can be run in different ways, either to destroy plutonium, to maximise energy production, or to produce new plutonium. Under the PRISM proposal now being considered at Sellafield, plutonium destruction would be the priority. "We could deal with the plutonium stockpile in Britain in five years," says Loewen. But equally, he says, it could generate energy, too. The proposed plant has a theoretical generating capacity of 600 megawatts.¶ Fast reactors could do the same for the U.S. Under the presidency of George W. Bush, the U.S. launched a Global Nuclear Energy Partnership aimed at developing technologies to consume plutonium in spent fuel. But President Obama drastically cut the partnership's funding, while also halting work on the planned Yucca Mountain geological repository. "We are left with a million-year problem," says Loewen. "Right now there isn't a policy framework in the U.S. for solving this issue."¶

#### The impact is nuclear war and WMD terrorism.

**Allison 1996** (Graham, director of the Center for Science and International Affairs at Harvard University's Kennedy School of Government, Houston Chronicle, “Russia's Loose Nukes a Serious Threat to US,” April 1, http://belfercenter.ksg.harvard.edu/publication/1012/russias\_loose\_nukes\_a\_serious\_threat\_to\_us.html)

The greatest single threat to the security of America today, and indeed the world, is the threat from loose nuclear weapons and weapons-usable material from Russia. "Loose nukes' – the loss, theft or sale of weapons-usable nuclear materials or nuclear weapons themselves from the former Soviet arsenal – is not a hypothetical threat; it is a brute fact. Since the disappearance of the Soviet Union, the number of reported, suspected and documented cases of diversion of weapons-usable nuclear material has been increasing steadily. Ominously, we have been able to document six cases in which weapons-grade material has been stolen and nearly 1,000 instances involving the theft of lower-grade material. If a rogue actor – a state like Iran, Iraq, Libya or Cuba, or a terrorist group like Hamas or Japan's Aum Shinrikyo – obtained as little as 30 pounds of highly-enriched uranium, or less than half that weight in plutonium, they could produce a nuclear device in a matter of a month or two with design information that is publicly available, equipment that can be readily purchased in the commercial market and modest levels of technical competence found in graduates of any respectable engineering program. If the terrorists who attacked the World Trade Center in New York or the Federal Office Building in Oklahoma City had used the same truck they drove, filled not with the explosives they used, but rather with a weapon that started with a softball-sized lump of uranium, what would have been the consequences? They could have created an explosion equal to 10,000 to 20,000 tons of TNT, which would demolish an area of about three square miles. Oklahoma City would have disappeared. As the most open society in the world, the United States is also most vulnerable to nuclear terrorist attack. Literally millions of uninspected packages arrive in this country every day.

### 2AC Harvard Geoengineering CP

#### Can’t solve – just shifts regional climate problems around and exacerbates ocean acidification

**Kenward 11** [Alyson, “Brighten the Water: Proceed with Caution”, Feb 15, ClimateCentral]

Seitz’s findings, published in Climatic Change in December 2010, says that this approach to SRM has the advantage of being more localized than spraying aerosols into the atmosphere, so it is less risky to humans. He proposes that teeny tiny bubbles can be easily injected into the water, at low cost and without requiring much energy. Sounds great, you might think.¶ Not so fast, says Alan Robock.¶ As an atmospheric scientist at Rutgers University, Robock has been studying the potential effects of different types of SRM on the planet. A few days ago, he posted an official response to Seitz’s “brighten the water” pitch, also in Climatic Change. In it, Robock points out that although increasing reflectivity of ocean water takes away some of the risks that come along with pumping sulfate aerosols into the air, it also introduces a host of new ones — risks that can’t be fully evaluated or easily managed.¶ For example, Robock points out that if parts of the ocean are engineered to be more reflective and consequently absorb less heat, the movement of heat in the ocean may change, and there is the potential that regional climate and weather would be affected.¶ Just think about how much global climate has been influenced this year by the cool ocean waters of La Niña in the Pacific: increased rainfall in Asia, Australia and parts of South America; heavier snowfall in parts of the U.S.; and more severe drought in the American Southwest.¶ Affecting the way oceans absorb and retain heat may impact crucial ocean currents, causing unusual weather in some places. Credit: NOAA¶ Furthermore, cooler ocean temperatures and less sunlight is bound to have some influence on marine life, although it is difficult to predict exactly what would happen. Colder water also holds more CO2, so Robock mentions that there might be more risk of ocean acidification using Seitz’s technique.¶ Robock writes:¶ “Bubble generation in the ocean should be added to the list of solar radiation management options being considered as part of geoengineering, but it needs to be rigorously evaluated, [along with marine cloud brightening and stratospheric aerosol generation], in terms of its costs, benefits, and risks.”

#### Hydrological cycle collapse causes extinction

**Bryant, 3 –** Donald A. Bryant, Dep’t. of Biochemistry and Molecular Biology @ Penn. State University, “The Beauty in Small Things Revealed”, Proceedings of the National Academy of Sciences, August 19, 2003, http://www.pnas.org/cgi/content/full/100/17/9647

Oxygenic photosynthesis accounts for nearly all the primary biochemical production of organic matter on Earth. The byproduct of this process, oxygen, facilitated the evolution of complex eukaryotes and supports their/our continuing existence. Because macroscopic plants are responsible for most terrestrial photosynthesis, it is relatively easy to appreciate the importance of photosynthesis on land when one views the lush green diversity of grasslands or forests. However, Earth is the "blue planet," and oceans cover nearly 75% of its surface. All life on Earth equally depends on the photosynthesis that occurs in Earth's oceans. '

#### Dead zones expansion cause extinction

**Cavelle 08** (Jenna, “The Human Factor: Eutrophication, Dead Zones and the Future of Our Oceans,” Baha Life, Issue 26, http://www.bajalife.com/ecowatch/ecowatch26.html)

It all comes down to what we value the most. Financial security? Health? Family? Survival as a species? What will happen to civilization as we know it if the life-sustaining resources we depend on are destroyed from chemical fertilizers and runoff? I know that most people aren’t going to have as hard of a time saying good-bye to the kangaroo rat as I will, but what about clean water and edible food? If we don’t change soon, we may be forced to say good-bye to our livelihood with the same degree of ease and comfort as we would a pesky rodent. Dead zones don’t just threaten endangered species and biodiversity, but also the health of the public and the global economy. For example, red tides can cause outbreaks of life-threatening diseases, such as paralytic shellfish poisoning, which will shut down mussel and clam harvesting. In Mexico, recreational and commercial fishing, both major industries in the Sea of Cortez, face potential collapse. These problems are not limited to local Bajawaters; they touch the shores of every single continent on the planet. The environmental and economic impact is being felt everywhere as environmentalists and economists alike agree that rising food prices will continue to climb well into the future. If dead zones increase at the current rate, we can expect greater price surges, greater seafood shortages and greater toxicity. Evidence linking global agribusiness to ocean health is irrefutable. As a direct result of global warming, some scientists believe mass extinctions of terrestrial animals will probably happen first. Any scientist will tell you that our rivers and oceans are headed for a disaster so great that humans too, could face extinction. Today’s average extinction rate is between 1,000 to 10,000 times faster than it was 60 million years ago. Back then, new species evolved faster than existing species disappeared. This is why humans witnessed so much biodiversity when they arrived on the scene. But evolution is falling behind. It is estimated that 30 million different species inhabit the planet and each year thousands of those species, ranging from tiny microorganisms to huge mammals, are forever lost. Many are gone before they are discovered.

#### Independently Co2 causes oxygen collapse – extinction

Peter **Tatchell**, The Guardian, “The oxygen crisis,” **2008**, http://www.guardian.co.uk/commentisfree/2008/aug/13/carbonemissions.climatechange

The rise in carbon dioxide emissions is big news. It is prompting action to reverse global warming. But little or no attention is being paid to the long-term fall in oxygen concentrations and its knock-on effects. Compared to prehistoric times, the level of oxygen in the earth's atmosphere has declined by over a third and in polluted cities the decline may be more than 50%. This change in the makeup of the air we breathe has potentially serious implications for our health. Indeed, it could ultimately **threaten the survival of human life** on earth, according to Roddy Newman, who is drafting a new book, The Oxygen Crisis. I am not a scientist, but this seems a reasonable concern. It is a possibility that we should examine and assess. So, what's the evidence? Around 10,000 years ago, the planet's forest cover was at least twice what it is today, which means that forests are now emitting only half the amount of oxygen. Desertification and deforestation are rapidly accelerating this long-term loss of oxygen sources. The story at sea is much the same. Nasa reports that in the north Pacific ocean oxygen-producing phytoplankton concentrations are 30% lower today, compared to the 1980s. This is a huge drop in just three decades. Moreover, the UN environment programme confirmed in 2004 that there were nearly 150 "dead zones" in the world's oceans where discharged sewage and industrial waste, farm fertiliser run-off and other pollutants have reduced oxygen levels to such an extent that most or all sea creatures can no longer live there. This oxygen starvation is reducing regional fish stocks and diminishing the food supplies of populations that are dependent on fishing. It also causes genetic mutations and hormonal changes that can affect the reproductive capacity of sea life, which could further diminish global fish supplies. Professor Robert Berner of Yale University has researched oxygen levels in prehistoric times by chemically analysing air bubbles trapped in fossilised tree amber. He suggests that humans breathed a much more oxygen-rich air 10,000 years ago. Further back, the oxygen levels were even greater. Robert Sloan has listed the percentage of oxygen in samples of dinosaur-era amber as: 28% (130m years ago), 29% (115m years ago), 35% (95m years ago), 33% (88m years ago), 35% (75m years ago), 35% (70m years ago), 35% (68m years ago), 31% (65.2m years ago), and 29% (65m years ago). Professor Ian Plimer of Adelaide University and Professor Jon Harrison of the University of Arizona concur. Like most other scientists they accept that oxygen levels in the atmosphere in prehistoric times averaged around 30% to 35%, compared to only 21% today – and that the levels are even less in densely populated, polluted city centres and industrial complexes, perhaps only 15 % or lower. Much of this recent, accelerated change is down to human activity, notably the industrial revolution and the **burning of fossil fuels.** The Professor of Geological Sciences at Notre Dame University in Indiana, J Keith Rigby, was quoted in 1993-1994 as saying: In the 20th century, humanity has pumped increasing amounts of carbon dioxide into the atmosphere by burning the carbon stored in coal, petroleum and natural gas. In the process, we've also been consuming oxygen and destroying plant life – cutting down forests at an alarming rate and thereby short-circuiting the cycle's natural rebound. We're artificially slowing down one process and speeding up another, forcing a change in the atmosphere. Very interesting. But does this decline in oxygen matter? Are there any practical consequences that we ought to be concerned about? What is the effect of lower oxygen levels on the human body? Does it disrupt and impair our immune systems and therefore make us more prone to cancer and degenerative diseases? Surprisingly, no significant research has been done, perhaps on the following presumption: the decline in oxygen levels has taken place over millions of years of our planet's existence. The changes during the shorter period of human life have also been slow and incremental – until the last two centuries of rapid urbanisation and industrialisation. Surely, this mostly gradual decline has allowed the human body to evolve and adapt to lower concentrations of oxygen? Maybe, maybe not. The pace of oxygen loss is likely to have speeded up massively in the last three decades, with the industrialisation of China, India, South Korea and other countries, and as a consequence of the massive worldwide increase in the burning of fossil fuels. In the view of Professor Ervin Laszlo, the drop in atmospheric oxygen has potentially serious consequences. A UN advisor who has been a professor of philosophy and systems sciences, Laszlo writes: Evidence from prehistoric times indicates that the oxygen content of pristine nature was above the 21% of total volume that it is today. It has decreased in recent times due mainly to the burning of coal in the middle of the last century. Currently the oxygen content of the Earth's atmosphere dips to 19% over impacted areas, and it is down to 12 to 17% over the major cities. At these levels it is difficult for people to get sufficient oxygen to maintain bodily health: it takes a proper intake of oxygen to keep body cells and organs, and the entire immune system, functioning at full efficiency. At the levels we have reached today cancers and other degenerative diseases are likely to develop. And at 6 to 7% life can no longer be sustained.

#### CP is all theory – can’t solve warming

**Caldiera and Keith 10** [Ken Caldiera, David W. Keith, “The Need for Climate Engineering Research”, Ken Caldeira (kcaldeira@carnegie.stanford.edu) is a senior scientist in the Department of Global Ecology at the Carnegie Institution in Stanford, California. David W. Keith (keith@ucalgary.ca) is director of the Energy and Environmental Systems Group at the Institute for Sustainable Energy, Issues in Science and Technology, 2010]

**SRM = Solar Radiation Management**

Whitening the surface. It has been proposed that whitening roofs, crops, or the ocean surface would reflect more¶ sunlight to space, thereby exerting a cooling influence on¶ planetary temperatures. With regard to crops, there is simply not enough crop area or potential for change in reflectivity for this sector to be a game changer. Similarly, there is¶ not enough roof area for changing roof color to make a substantive difference in global climate change, although whitening roofs in some cases may confer co-benefits (such as reducing cooling costs and helping reduce the urban heat island effect). Various proposals have been made to whiten¶ the ocean surface, stemming back to at least the early 1960s,¶ but the ability to do so has not been demonstrated.¶ In their current form, the best SRM methods have several¶ common properties: They have relatively low direct costs¶ of deployment, they may be deployed rapidly and are fastacting, and they are imperfect. They are intrinsically imperfect because greenhouse gases and sunlight act differently in Earth’s climate system.

### 2AC cyber

#### No Cybersecurity bill

Tim Starks (writer for Congressional Quarterly) November 8, 2012 “Cybersecurity Bill Prospects Remain Slim, With or Without Executive Order” http://public.cq.com/docs/news/news-000004173248.html

President Obama’s re-election means he is likely to soon issue an executive order on cybersecurity, something a President Romney probably would not have done — and that executive order could impact the prospects of Congress enacting legislation to defend the nation’s computer networks. Senate Majority Leader Harry Reid, D-Nev., last month said he would bring up a stymied cybersecurity bill (S 3414) during the lame-duck session. A Senate Democratic aide said that Reid still intends to do so. “Sen. Reid is committed to addressing cybersecurity and plans to bring the Cybersecurity Act of 2012 back to the floor when Congress returns,” the aide said. “Republicans who claim to understand the urgency of cyberthreats will have one more chance to act, and work with Democrats to pass this.” In the meantime, though, the executive order — expected to mimic some of the stymied bill’s private sector voluntary standards and threat information sharing initiatives — could drop. And it’s not clear whether that order could nudge Congress to act. “No one’s really sure if the executive order is going to make it harder or easier to do a bill,” said another Senate aide, who added that there are signs the order could come down during the lame-duck session. Paul Rosenzweig, a security consultant and Heritage Foundation visiting fellow, said the order is unlikely to sway Republicans, although it’s the biggest factor for what might happen in a lame-duck session. “The major dynamic-changer will be the executive order,” he said. “The president has threatened to bring out the executive order blunderbuss and fire it at them but I don’t think they’ll flinch.” Senate Homeland Security and Governmental Affairs Chairman Joseph I. Lieberman, I-Conn., chief sponsor of the stymied bill, has said he hopes the order would be unpalatable enough to Republicans — because it would enforce stricter standards on the most at-risk companies than his legislation — that it would in turn prompt the GOP to seek a legislative compromise. But the contents of the order could also undo some of the bill’s momentum, if it hews too closely to the legislation and makes passing a bill seem less necessary, Rosenzweig said. When the Senate voted 52-46 on a motion to end debate on the bill in August, it fell short of the 60 votes needed to end a filibuster. It is not clear if some of the six Democrats who voted against the motion could be swayed to support it a second time. Jon Tester, for instance, was in the midst of a close reelection campaign in Montana, and is now free of those pressures. Reid himself was one of the six who voted “no,” for procedural reasons. But even if all of those Democrats switch votes, some additional Republicans would have to be enlisted to overcome the 60-vote threshold, making it an uphill climb unless an executive order spooks the GOP. Many Republicans favor a more stripped-down bill like the one the House passed (HR 3523) that would only address how to improve threat information sharing between the federal government and industry. One group of Senate Republicans has introduced alternative legislation (S 3342) that also focuses primarily on information sharing. “The House passed an information-sharing bill with strong protections for privacy and civil liberties by an overwhelming bipartisan vote, and both Senate cyberbills have information sharing titles with very similar structures to the House bill that I believe we can reconcile if we put our minds to it,” said House Intelligence Chairman Mike Rogers, the Michigan Republican who is the chief sponsor of the information sharing bill. “American companies are under attack — they need our help, and they need it now. We don’t have a consensus in either the House or the Senate on broader issues like critical infrastructure regulation.” But so far, Democrats have shown no signs of budging off the necessity that a cybersecurity bill address private sector security standards for the most vital digital infrastructure. They contend that they have compromised enough by making the Senate bill’s standards voluntary rather than mandatory, and that Republicans need to move toward their position. If Congress doesn’t enact any cybersecurity legislation in the lame-duck session, the Senate picture becomes slightly more favorable for a reintroduced bill similar to the one that is currently tied up. The Democratic gains in the Senate, combined with a broad influx of new members, could play to the advantage of the bill sponsors, said one Senate aide, noting that some of the new senators are less likely to be as dug into opposition as those who have already wrestled with the subject. On the other hand, one of the Democrats’ gains in the election was the seat held by Scott P. Brown, R-Mass., and he had voted in favor of moving forward with the Senate bill. The aide also said that the longer Congress goes without acting, the more senators will become aware of the growing threat. Another change in the Senate dynamic next year would be a shift in who would be pressing for passage. Lieberman is retiring, leaving the workload to fellow bill sponsors John D. Rockefeller IV, D-W. Va., Susan Collins, R-Maine, Dianne Feinstein, D-Calif. and Thomas R. Carper, D-Del. Carper is expected to replace Lieberman atop the Homeland Security and Governmental Affairs Committee, and while Lieberman has campaigned tirelessly for the bill, Carper’s staff has already indicated that cybersecurity legislation would be one of his top priorities if a bill doesn’t pass in the lame duck. Rosenzweig, however, said the overall dynamic for the Senate cybersecurity legislation next year will not change significantly, since neither party is likely to change its views on regulation of critical infrastructure.

#### No ev their bill sovles No impact

**Rid 12** – a [Reader in War Studies](http://www.kcl.ac.uk/sspp/departments/warstudies/people/readers/rid.aspx) at King’s College London. He also is a non-resident fellow at the [Center for Transatlantic Relations](http://transatlantic.sais-jhu.edu/) in the School for Advanced International Studies, Johns Hopkins University, in Washington, DC. In 2009/2010, Rid was a visiting scholar at the Hebrew University and the Shalem Center in Jerusalem. From 2006 to 2009 he worked at the Woodrow Wilson Center and the RAND Corporation in Washington, and at the Institut français des relations internationales in Paris. Rid wrote his first book and thesis at the Berlin-based Stiftung Wissenschaft und Politik, Germany’s major government-funded foreign policy think tank. Rid holds a PhD from the Humboldt Universität zu Berlin (Thomas, March/April, “Think Again: Cyberwar” <http://www.foreignpolicy.com/articles/2012/02/27/cyberwar?page=0,6>) Jacome

"Cyberwar Is Already Upon Us."

No way**.** "Cyberwar is coming!" John Arquilla and David Ronfeldt predicted in a celebrated [Rand paper](http://www.rand.org/pubs/reprints/RP223.html) back in 1993. Since then, it seems to have arrived -- at least by the account of the U.S. military establishment, which is busy competing over who should get what share of the fight. Cyberspace is "a domain in which the Air Force flies and fights," Air Force Secretary Michael Wynne [claimed](http://www.8af.af.mil/news/story_print.asp?id=123031989) in 2006. By 2012, William J. Lynn III, the deputy defense secretary at the time, was [writing](http://www.defense.gov/home/features/2010/0410_cybersec/lynn-article1.aspx) that cyberwar is "just as critical to military operations as land, sea, air, and space." In January, the Defense Department [vowed](http://www.defense.gov/news/Defense_Strategic_Guidance.pdf) to equip the U.S. armed forces for "conducting a combined arms campaign across all domains -- land, air, maritime, space, and cyberspace." Meanwhile, growing piles of books and articles explore the threats of cyberwarfare, cyberterrorism, and how to survive them.

Time for a reality check: Cyberwar is still more hype than hazard. Consider the definition of an act of war: It has to be potentially violent, it has to be purposeful, and it has to be political. The cyberattacks we've seen so far, from Estonia to the Stuxnet virus, simply don't meet these criteria.

Take the dubious story of a Soviet pipeline explosion back in 1982, much cited by cyberwar's true believers as the most destructive cyberattack ever. The account goes like this: In June 1982, a Siberian pipeline that the CIA had virtually booby-trapped with a so-called "logic bomb" exploded in a monumental fireball that could be seen from space. The U.S. Air Force estimated the explosion at 3 kilotons, equivalent to a small nuclear device.Targeting a Soviet pipeline linking gas fields in Siberia to European markets, the operation sabotaged the pipeline's control systems with softwarefrom a Canadian firmthat the CIA had doctored with malicious code. No one died, according to Thomas Reed, a U.S. National Security Council aide at the time who revealed the incident in his 2004 book, [*At the Abyss*](http://www.amazon.com/gp/product/0891418377/ref=as_li_ss_tl?ie=UTF8&tag=fopo-20&linkCode=as2&camp=1789&creative=390957&creativeASIN=0891418377); the only harm came to the Soviet economy.

But did it really happen? After Reed's account came out, Vasily Pchelintsev, a former KGB head of the Tyumen region, where the alleged explosion supposedly took place, denied the story. There are also no media reports from 1982 that confirm such an explosion, though accidents and pipeline explosions in the Soviet Union were regularly reported in the early 1980s. Something likely did happen, but Reed's book is the only public mention of the incident and his account relied on a single document. Even after the CIA declassified a redacted version of Reed's source, a note on the so-called Farewell Dossier that describes the effort to provide the Soviet Union with defective technology, the agency did not confirm that such an explosion occurred. The available evidence on the Siberian pipeline blast is so thin that it shouldn't be counted as a proven case of a successful cyberattack.

Most other commonly cited cases of cyberwar are even less remarkable. Take the attacks on Estonia in April 2007, which came in response to the controversial relocation of a Soviet war memorial, the *Bronze Soldier*. The well-wired country found itself at the receiving end of a massive distributed denial-of-service attack that emanated from up to 85,000 hijacked computers and lasted three weeks. The attacks reached a peak on May 9, when 58 Estonian websites were attacked at once and the online services of Estonia's largest bank were taken down. "[What's the difference](http://www.tandfonline.com/doi/pdf/10.1080/01402390.2011.608939) between a blockade of harbors or airports of sovereign states and the blockade of government institutions and newspaper websites?" [asked](http://www.vedomosti.ru/smartmoney/article/2007/05/28/3004) Estonian Prime Minister Andrus Ansip.

Despite his analogies, the attack was no act of war. It was certainly a nuisance and an emotional strike on the country, but the bank's actual network was not even penetrated; it went down for 90 minutes one day and two hours the next. The attack was not violent, it wasn't purposefully aimed at changing Estonia's behavior, and no political entity took credit for it. The same is true for the vast majority of cyberattacks on record.

Indeed, there is no known cyberattack that has caused the loss of human life. No cyberoffense has ever injured a person or damaged a building. And if an act is not at least potentially violent, it's not an act of war. Separating war from physical violence makes it a metaphorical notion; it would mean that there is no way to distinguish between World War II, say, and the "wars" on obesity and cancer. Yet those ailments, unlike past examples of cyber "war," actually do kill people.

"A Digital Pearl Harbor Is Only a Matter of Time."

Keep waiting. U.S. Defense Secretary Leon Panetta delivered a [stark warning](http://www.defense.gov/transcripts/transcript.aspx?transcriptid=4861) last summer: "We could face a cyberattack that could be the equivalent of Pearl Harbor." Such alarmist predictions have been ricocheting inside the Beltway for the past two decades, and some scaremongers have even upped the ante by raising the alarm about a cyber 9/11. In his 2010 book, [Cyber War](http://www.amazon.com/gp/product/0061962236?ie=UTF8&tag=fopo-20&linkCode=as2&camp=1789&creative=390957&creativeASIN=0061962236), former White House counterterrorism czar Richard Clarke invokes the specter of nationwide power blackouts, planes falling out of the sky, trains derailing, refineries burning, pipelines exploding, poisonous gas clouds wafting, and satellites spinning out of orbit -- events that would make the 2001 attacks pale in comparison.

But the empirical record is less hair-raising, even by the standards of the most drastic example available. Gen. Keith Alexander, head of U.S. Cyber Command (established in 2010 and now boasting a budget of more than $3 billion), shared his worst fears in an April 2011 speech at the University of Rhode Island: "What I'm concerned about are destructive attacks," Alexander said, "those that are coming." He then invoked a remarkable accident at Russia's Sayano-Shushenskaya hydroelectric plant to highlight the kind of damage a cyberattack might be able to cause. Shortly after midnight on Aug. 17, 2009, a 900-ton turbine was ripped out of its seat by a so-called "water hammer," a sudden surge in water pressure that then caused a transformer explosion. The turbine's unusually high vibrations had worn down the bolts that kept its cover in place, and an offline sensor failed to detect the malfunction. Seventy-five people died in the accident, energy prices in Russia rose, and rebuilding the plant is slated to cost $1.3 billion.

#### Immigration reform is at the top of the agenda

Manu Raji (writer for Politico) November 7, 2012 “Harry Reid agenda: Filibuster crackdown, tax increases” http://www.politico.com/news/stories/1112/83514.html

Once the procedural snafus are resolved, Reid said “very high” on his priority list will be an attempt to pass an immigration overhaul, an issue important to the Latino community that powered Tuesday night’s Democratic wins. But it would certainly start a divisive and emotional debate certain to alienate conservative members of both parties. Reid said he could get 90 percent of his caucus to support such a measure. Republicans, he said, would block immigration reform “at their peril.” “Not for political reasons; because it’s the wrong thing to do to not have comprehensive immigration reform,” Reid said. “The system’s broken and needs to be fixed.”

#### Sportsman act is the first scheduled vote in the lame duck

Chad Pergram (writer for Fox News) October 27, 2012 “The Hitchhiker's Guide to the Lame Duck Session of Congress” http://politics.blogs.foxnews.com/2012/10/27/hitchhikers-guide-lame-duck-session-congres

The Congressional schedule for this lame duck session is remarkably abbreviated. The House and Senate are both slated to next meet on Tuesday, November 13. That's a little later simply because that Monday is Veterans' Day. The Senate hasn't set any schedule other than a procedural vote at 5:30 pm on "The Sportsmen Act." But the House plans to be in session through the 16th and then take off the next week for Thanksgiving. The House then comes back November 27-30, December 3-6 and December 11-14. That's an incredible time-crunch. For starters, no one on Capitol Hill is anticipating the House freshman to start arriving until the week of November 13th. Then there are leadership elections in both bodies. House Minority Leader Nancy Pelosi (D-CA) says Democratic leadership elections won't hit until November 29. So in addition to figuring out which party is in charge of what (if electoral disputes linger), it doesn't look like Congress can truly get down to business on the pressing legislative issues until December.

#### Wind energy tax credit will create a fight now

Peter Schorsch (Executive Editor of SaintPetersblog and President of Extensive Enterprises Online, LLC) November 8, 2012 “Lawmakers face a busy lame duck session” http://saintpetersblog.com/2012/11/lawmakers-face-a-busy-lame-duck-session/

Wind energy tax credits: “After simmering for the better part of this year, the battle over the wind-energy production tax credit will reach a fevered pitch during the lame-duck session. But supporters and detractors of the policy, which will expire at year’s end unless both chambers vote to renew it, acknowledge that the tax credit’s fate hinges less on its own particular merit and more on how successful lawmakers are at striking a deal to extend a wide range of tax extenders.”

#### Nuclear power has tons of political support.

Koplow, ‘11

[Doug, founder of Earth Track, Inc., has worked on natural resource subsidy issues for more than 20 years, mainly in the energy sector, holds a B.A. in economics from Wesleyan University, M.B.A. from the Harvard Graduate School of Business Administration, Union of Concerned Scientists, February, “Nuclear Power: Still Not Viable Without Subsidies,” http://www.ucsusa.org/assets/documents/nuclear\_power/nuclear\_subsidies\_report.pdf]

The industry and its allies are now pressuring all levels of government for large new subsidies to support the construction and operation of a new generation of reactors and fuel-cycle facilities. The substantial political support the industry has attracted thus far rests largely on an uncritical acceptance of the industry’s economic claims and an incomplete understanding of the subsidies that made—and continue to make—the existing nuclear fleet possible.

#### PC not key

**Klein, 3/19/12** [The Unpersuaded Who listens to a President? by [Ezra Klein](http://www.newyorker.com/magazine/bios/ezra_klein/search?contributorName=ezra%20klein) March 19, 2012, Ezra Klein is the editor of Wonkblog and a columnist at the Washington Post, as well as a contributor to MSNBC and Bloomberghttp://www.newyorker.com/reporting/2012/03/19/120319fa\_fact\_klein#ixzz1p36PrMbH]

This, Edwards says, is the reality facing modern Presidents, and one they would do well to accommodate. “In a rational world, strategies for governing should match the opportunities to be exploited,” he writes. “Barack Obama is only **the latest** in a **long line** of presidents who have not been able to transform the political landscape **through** their efforts at **persuasion**. When he succeeded in achieving major change, it was by mobilizing those ***predisposed* to support** him and driving legislation through Congress on a party-line vote.”

That’s easier said than done. We don’t have a system of government set up for Presidents to drive legislation through Congress. Rather, we have a system that was designed to encourage division between the branches but to resist the formation of political parties. The parties formed anyway, and they now use the branches to compete with one another. Add in minority protections like the filibuster, and you have a system in which the job of the President is to persuade an opposition party that has both the incentive and the power to resist him.

Jim Cooper says, “We’ve effectively lost our Congress and gained a parliament.” He adds, “At least a Prime Minister is empowered to get things done,” but “we have the extreme polarization of a parliament, with party-line voting, without the empowered Prime Minister.” And you can’t solve that with a speech.

#### Winners win

**Halloron, 10** [Liz, National Public Radio, “For Obama what a difference a win will make”, <http://www.npr.org/templates/story/story.php?storyId=125594396>]

Amazing what a win in a **major legislative battle** will do for a president's spirit. (Turmoil over spending and leadership at the Republican National Committee over the past week, and the release Tuesday of a major new and largely sympathetic book about the president by New Yorker editor David Remnick, also haven't hurt White House efforts to drive its own, new narrative.) Obama's Story New Yorkereditor David Remnick has a new book out about Obama. Listen to an interview with Remnick and read a review. ['The Bridge': Remnick On The Ascent Of Obama](http://www.npr.org/templates/story/story.php?storyId=125595945&ps=rs) April 6, 2010 ['Bridge' Tells Obama's Story, Just As We Remember It](http://www.npr.org/templates/story/story.php?storyId=125093691&ps=rs) April 5, 2010 Though the president's national job approval ratings failed to get a boost by the passage of the health care overhaul — his numbers have remained steady this year at just under 50 percent — he has earned grudging respect even from those who don't agree with his policies. "He's achieved something that virtually everyone in Washington thought he couldn't," says Henry Olsen, vice president and director of the business-oriented American Enterprise Institute's National Research Initiative. "And that's given him confidence." The protracted health care battle looks to have taught the White House something about power, says presidential historian Gil Troy — a lesson that will inform Obama's pursuit of his initiatives going forward. "I think that Obama realizes that **presidential power is a muscle**, and the more you exercise it, the stronger it gets," Troy says. "He exercised that power and had a success with health care passage, and now he wants to make sure people realize it's not just a blip on the map." The White House now has an opportunity, he says, to change the narrative that had been looming — that the Democrats would lose big in the fall midterm elections, and that Obama was looking more like one-term President Jimmy Carter than two-termer Ronald Reagan, who also managed a difficult first-term legislative win and survived his party's bad showing in the midterms. Approval Ratings Obama is exuding confidence since the health care bill passed, but his approval ratings as of April 1 remain unchanged from the beginning of the year, according to [Pollster.com](http://www.pollster.com/polls/us/jobapproval-obama.php). What's more, just as many people disapprove of Obama's health care policy now as did so at the beginning of the year. According to the most recent numbers: Forty-eight percent of all Americans approve of Obama, and 47 disapprove. Fifty-two percent disapprove of Obama's health care policy, compared with 43 percent who approve. **Stepping Back From A Precipice** Those watching the re-emergent president in recent days say it's difficult to imagine that it was only weeks ago that Obama's domestic agenda had been given last rites, and pundits were preparing their pieces on a failed presidency. Obama himself had framed the health care debate as a referendum on his presidency. A loss would have "ruined the rest of his presidential term," says Darrell West, director of governance studies at the liberal-leaning Brookings Institution. "It would have made it difficult to address other issues and emboldened his critics to claim he was a failed president." The conventional wisdom in Washington after the Democrats lost their supermajority in the U.S. Senate when Republican Scott Brown won the Massachusetts seat long held by the late Sen. Edward Kennedy was that Obama would scale back his health care ambitions to get something passed. "I thought he was going to do what most presidents would have done — take two-thirds of a loaf and declare victory," says the AEI's Olsen. "But he doubled down and made it a vote of confidence on his presidency, parliamentary-style." "You've got to be impressed with an achievement like that," Olsen says. But Olsen is among those who argue that, long-term, Obama and his party would have been better served politically by an incremental approach to reworking the nation's health care system, something that may have been more palatable to independent voters Democrats will need in the fall. "He would have been able to show he was listening more, that he heard their concerns about the size and scope of this," Olsen says. **Muscling out a win** on a sweeping health care package may have invigorated the president and **provided evidence of leadership**, but, his critics say, it remains to be seen whether Obama and his party can reverse what the polls now suggest is a losing issue for them. **Golden Boy Tested** One of the questions that has trailed Obama is how he would deal with criticism and the prospect of failure, says Troy, a McGill University history professor and visiting scholar affiliated with the bipartisan Policy Center in Washington. "He is one of those golden boys who never failed in his life, and people like that are often not used to criticism and failure," Troy says. Obama and his campaign were temporarily knocked for a loop early in the 2008 presidential campaign by then-GOP vice presidential candidate Sarah Palin's "zingers," Troy says, "and Obama was thrown off balance again by the loss of the Massachusetts Senate seat." The arc of the health care debate reminded observers that Obama is not just a product of Harvard, but also of tough Chicago politics, Troy says. "You don't travel as far and as fast as Barack Obama without having a spine of steel," he says. "He has an ability to regenerate, to come back, and knows that there is no such thing as a dirty win: a win is a win" — even if it infuriates the progressive wing of the president's party, which wanted far more sweeping changes to the nation's health care system. **GOP Stumbles** Obama's new mojo has been abetted, in a way, by high-profile troubles at the Republican National Committee. RNC Chairman Michael Steele has been under fire over the past week for his spending on private jets and limousines, and a staffer resigned after submitting to the committee a nearly $2,000 tab for a visit by young party members to a risque Los Angeles nightclub. The disarray intensified Monday with the resignation of the committee's chief of staff, and growing anger among top GOP strategists and fundraisers. "Steele has kept Republicans off-message," says West, of Brookings. "Every story about RNC spending is one less story about their views on health care at a time when news coverage has shifted in a more favorable direction." The distraction continued Monday when detractors accused Steele of playing the race card after he told ABC News that as an African American, he, like Obama, is being held to a higher standard. White House Spokesman Robert Gibbs, when asked about Steele's assertion, said the RNC chairman's problem "isn't the race card, it's the credit card." The controversy, Olsen says, hasn't been good for the Republicans' preparations for elections in terms of money and organization. But he doesn't view it as "a voter issue." **How Win Translates** When Reagan won his tough legislative battle in the early 1980s, it was over tax cuts, something voters saw as directly related to the then-dismal economy. Obama has long made a case for health care reform as a big piece of economic reform, but it's a difficult argument to make to voters, Olsen says, particularly when many of the health care law's major provisions don't go into effect for another four years. But observers like Troy say they believe that though initially unrelated, a boost in employment among Americans would encourage voters to look more favorably on the health care overhauls. "The perceived success of health care legislation rides on job creation," Troy says. Economists have recently declared the nation's recession, which began in 2007, over. But the unemployment rate has remained stubbornly at just under 10 percent. "I think he understands he's in a crucial period of his presidency," Olsen says. "He's taken a lot of risks, and there's not immediate rewards." Obama faces continuing tests on other big domestic issues, including Wall Street reform, the economy and climate change, as well as myriad foreign policy challenges ranging from testy relations with Israel and uncertainties about Iran's nuclear capabilities, to wars in Iraq and Afghanistan. Late last month, the administration and Russia agreed to a new nuclear arms treaty that is expected to be signed Thursday in advance of an international summit in Washington. The world is waiting, Troy says, to see how the president's renewed confidence plays out on the international stage. But the newly invigorated president continues to encourage voters to wait and see what his efforts produce.

#### Fiscal cliff is the top of the agenda

Business World Digest November 7, 2012 “US investors now fear the fiscal cliff” Lexis

U.S. investors hit trading floors today with the same president and the same problems in gridlocked Washington and expected the same solution as always to a looming budget crisis that threatens the economy: punt and deal with it later. President Barack Obama beat back Republican challenger Mitt Romney to win a second term, but he will still have to contend with a Republican-controlled House of Representatives that could make forging a compromise on pressing issues like the coming "fiscal cliff" difficult. That so-called cliff is actually a dollar 600 billion package of automatic tax increases and spending cuts, scheduled to take effect at the end of 2012, that could severely strain economic growth. It is expected to be the top priority of the "lame-duck" Congress that will convene soon, though few hope for anything resembling a permanent solution to the problem. "The best thing that could have happened is what happened," said Robert Manning, chief executive of MFS Investment Management in Boston. "I don't think there will be any grand bargain at all, just small fixes that will kick the can down the road." Markets reacted negatively early Wednesday, as many feared they might do, with the S and P 500 immediately dropping 1.4 percent at the open. The index has rallied 67 percent since Obama took office - one of the most impressive runs ever for stocks under a single president. "The recent pre-election rally has reflected Wall Street predictions of an Obama victory, but positive sentiment will move to worries about the fiscal cliff and the ongoing euro zone debt crisis, resulting in market choppiness over the near term," said Martin Sass, chief executive of New York money manager MD Sass. Steven Englander, Citigroup's head of G10 foreign exchange strategy, agreed markets could panic toward year-end if it looks as though no deal is imminent to avoid the fiscal cliff. If that happens, investors will think twice about lending the U.S. government money at low interest rates, which would strain the economy, widen the deficit and hurt the dollar. It also raises the possibility that major credit-rating agencies will cut the U.S. debt rating. Standard and Poor's stripped the U.S. of its pristine triple-A rating in 2011; the agencies have said they will evaluate budget negotiations and solutions and may take action next year. (C ) Reuters

## 1ar

### Russia 1AR cards

#### Corruption outweighs revenue gains from resources and makes growth unsustainable

James Melik 6-28-2012; Reporter, Business Daily, BBC World Service Russia's growth stifled by corruption http://www.bbc.co.uk/news/business-18622833

President Vladimir Putin has said he wants to make Russia the fifth-biggest economy in the world. It currently stands at number 11. He wants to boost foreign investment as part of his new economic plan. But some foreign investors are worried about Mr Putin's return as head of state for another term of six years after allegations of vote-rigging and protests both before and following his re-election. Furthermore, despite Russia's rich resources and its place among the world's fastest-growing economies, there remains a general feeling that the country is underperforming and falling far short of its potential. According to Angus Roxburgh, former BBC Moscow correspondent and later a public-relations adviser to the Kremlin, there is one overriding reason why Russia is failing to achieve its economic potential and failing to attract outside investors: corruption.

### K 1ar cards

#### Incentives-based environmental action in the context of nuclear power is good---key to policy effectiveness

Economist 5 (The Economist, April 21, “Rescuing environmentalism”, <http://www.economist.com/node/3888006>

THE environmental movement's foundational concepts, its method for framing legislative proposals, and its very institutions are outmoded. Today environmentalism is just another special interest.” Those damning words come not from any industry lobby or right-wing think-tank. They are drawn from “The Death of Environmentalism”, an influential essay published recently by two greens with impeccable credentials. They claim that environmental groups are politically adrift and dreadfully out of touch. They are right. In America, greens have suffered a string of defeats on high-profile issues. They are losing the battle to prevent oil drilling in Alaska's wild lands, and have failed to spark the public's imagination over global warming. Even the stridently ungreen George Bush has failed to galvanise the environmental movement. The solution, argue many elders of the sect, is to step back from day-to-day politics and policies and “energise” ordinary punters with talk of global-warming calamities and a radical “vision of the future commensurate with the magnitude of the crisis”. Europe's green groups, while politically stronger, are also starting to lose their way intellectually. Consider, for example, their invocation of the woolly “precautionary principle” to demonise any complex technology (next-generation nuclear plants, say, or genetically modified crops) that they do not like the look of. A more sensible green analysis of nuclear power would weigh its (very high) economic costs and (fairly low) safety risks against the important benefit of generating electricity with no greenhouse-gas emissions. Small victories and bigger defeats The coming into force of the UN's Kyoto protocol on climate change might seem a victory for Europe's greens, but it actually masks a larger failure. The most promising aspect of the treaty—its innovative use of market-based instruments such as carbon-emissions trading—was resisted tooth and nail by Europe's greens. With courageous exceptions, American green groups also remain deeply suspicious of market forces. If environmental groups continue to reject pragmatic solutions and instead drift toward Utopian (or dystopian) visions of the future, they will lose the battle of ideas. And that would be a pity, for the world would benefit from having a thoughtful green movement. It would also be ironic, because far-reaching advances are already under way in the management of the world's natural resources—changes that add up to a different kind of green revolution. This could yet save the greens (as well as doing the planet a world of good). “Mandate, regulate, litigate.” That has been the green mantra. And it explains the world's top-down, command-and-control approach to environmental policymaking. Slowly, this is changing. Yesterday's failed hopes, today's heavy costs and tomorrow's demanding ambitions have been driving public policy quietly towards market-based approaches. One example lies in the assignment of property rights over “commons”, such as fisheries, that are abused because they belong at once to everyone and no one. Where tradable fishing quotas have been issued, the result has been a drop in over-fishing. Emissions trading is also taking off. America led the way with its sulphur-dioxide trading scheme, and today the EU is pioneering carbon-dioxide trading with the (albeit still controversial) goal of slowing down climate change. These, however, are obvious targets. What is really intriguing are efforts to value previously ignored “ecological services”, both basic ones such as water filtration and flood prevention, and luxuries such as preserving wildlife. At the same time, advances in environmental science are making those valuation studies more accurate. Market mechanisms can then be employed to achieve these goals at the lowest cost. Today, countries from Panama to Papua New Guinea are investigating ways to price nature in this way (see article). Rachel Carson meets Adam Smith If this new green revolution is to succeed, however, three things must happen. The most important is that prices must be set correctly. The best way to do this is through liquid markets, as in the case of emissions trading. Here, politics merely sets the goal. How that goal is achieved is up to the traders. A proper price, however, requires proper information. So the second goal must be to provide it. The tendency to regard the environment as a “free good” must be tempered with an understanding of what it does for humanity and how. Thanks to the recent Millennium Ecosystem Assessment and the World Bank's annual “Little Green Data Book” (released this week), that is happening. More work is needed, but thanks to technologies such as satellite observation, computing and the internet, green accounting is getting cheaper and easier. Which leads naturally to the third goal, the embrace of cost-benefit analysis. At this, greens roll their eyes, complaining that it reduces nature to dollars and cents. In one sense, they are right. Some things in nature are irreplaceable—literally priceless. Even so, it is essential to consider trade-offs when analysing almost all green problems. The marginal cost of removing the last 5% of a given pollutant is often far higher than removing the first 5% or even 50%: for public policy to ignore such facts would be inexcusable. If governments invest seriously in green data acquisition and co-ordination, they will no longer be flying blind. And by advocating data-based, analytically rigorous policies rather than pious appeals to “save the planet”, the green movement could overcome the scepticism of the ordinary voter. It might even move from the fringes of politics to the middle ground where most voters reside. Whether the big environmental groups join or not, the next green revolution is already under way. Rachel Carson, the crusading journalist who inspired greens in the 1950s and 60s, is joining hands with Adam Smith, the hero of free-marketeers. The world may yet leapfrog from the dark ages of clumsy, costly, command-and-control regulations to an enlightened age of **informed, innovative, incentive-based greenery**.

#### Capitalism is sustainable---self-correcting

Seabra 12 (Leo, has a background in Communication and Broadcasting and a broad experience which includes activities in Marketing, Advertising, Sales and Public Relations, 2/27, “Capitalism can drive Sustainability and also innovation,” http://seabraaffairs.wordpress.com/2012/02/27/capitalism-can-drive-sustainability-and-also-innovation/)

There are those who say that if the world does not change their habits, even the end of economic growth, and assuming alternative ways of living, will be a catastrophe. “Our lifestyles are unsustainable. Our expectations of consumption are predatory.Either we change this, or will be chaos”. Others say that the pursuit of unbridled economic growth and the inclusion of more people in consumption is killing the Earth. We have to create alternative because economic growth is pointing to the global collapse. “What will happen when billions of Chinese decide to adopt the lifestyle of Americans?” I’ll disagree if you don’t mind… **They might be** wrong. Completely wrong .. Even very intelligent people wrongly interpret the implications of what they observe when they lose the perspective of time. In the vast scale of time (today, decades, not centuries) it is the opposite of what expected, because they start from a false assumption: the future is the extrapolation of this. But not necessarily be. How do I know? Looking at history. What story? The history of innovation, this thing generates increases in productivity, wealth, quality of life in an unimaginable level. It is innovation that will defeat pessimism as it always did. It was innovation that made life today is incomparably better than at any other time in human history. And will further improve. Einstein, who was not a stupid person, believed that capitalism would generate crisis, instability, and growing impoverishment. He said: “The economic anarchy of capitalist society as it exists today is, in my opinion, the true source of evil.” The only way to eliminate this evil, he thought, was to establish socialism, with the means of production are owned by the company. A centrally controlled economy would adjust the production of goods and services the needs of people, and would distribute the work that needed to be done among those in a position to do so. This would guarantee a livelihood to every man, women and children. Each according to his possibilities. To each according to their needs. And guess what? What happened was the opposite of what Einstein predicted. Who tried the model he suggested, impoverished, screwed up. Peter Drucker says that almost of all thinking people of the late nineteenth century thought that Marx was right: there would be increased exploitation of workers by employers. They would become poorer, until one day, the thing would explode. Capitalist society was considered inherently unsustainable. It is more or less the same chat today. **Bullshit. Capitalism, with all appropriate regulations, self-**corrects. It is **an adaptive system that learns and changes by design. The design is just for the system to learn and change.** There was the opposite of what Einstein predicted, and held the opposite of what many predict, but the logic that “unlike” only becomes evident over time. It wasn’t obvious that the workers are those whom would profit from the productivity gains that the management science has begun to generate by organizing innovations like the railroad, the telegraph, the telephone .. to increase the scale of production and cheapen things. The living conditions of workers today are infinitely better than they were in 1900. They got richer, not poorer .. You do not need to work harder to produce more (as everyone thought), you can work less and produce more through a mechanism that is only now becoming apparent, and that brilliant people like Caetano Veloso still ignores. The output is pursuing growth through innovation, growth is not giving up. More of the same will become unsustainable to the planet, but most of it is not what will happen, will happen more different, than we do not know what is right. More innovative. Experts, such as Lester Brown, insist on statements like this: if the Chinese also want to have three cars for every four inhabitants, as in the U.S. today, there will be 1.1 billion cars there in 2030, and there is no way to build roads unless ends with the whole area used for agriculture. You will need 98 million barrels of oil per day, but the world only produces about 90 million today, and probably never produce much more. The mistake is to extrapolate today’s solutions for the future. We can continue living here for 20 years by exploiting the same resources that we explore today? Of course not. But the other question is: how can we encourage the stream of innovations that will enable the Chinese, Indians, Brazilians, Africans .. to live so as prosperous as Americans live today? Hey, wake up … what can not stop the engine of innovation is that the free market engenders. This system is self correcting, that is its beauty. We do not need to do nothing but ensure the conditions for it to work without distortion. The rest he does himself. It regulates itself.

#### Value to life is inevitable, subjective, and they don’t control the link to it.

**Shermer, 8** –Michael, founder of the Skeptics Society and Editor of Skeptic Magazine, “"The Meaning of Life, the Universe, and Everything"”—Commencement Speech at Whittier College, 5/23/08 http://www.whittier.edu/News/Articles/2008CommencementSpeech.aspx

Purpose is personal, and there are countless activities people engage in to satisfy this deep-seated need.There are, however, a handful of powerful means by which we can bootstrap ourselves toward higher goals that have proven to be especially beneficial to both individuals and society. Science tells us that there are five things you can do to create meaning and purpose in your life. Here they are: 1. Love and family—the bonding and attachment to others increases one's sphere of moral inclusion to care about others as much as, if not more than, oneself. And here I shall take a moment to acknowledge the courage of the California State Supreme Court to increase the possibility of marital happiness to the tens of thousands of gays and lesbians in our state who wish to enjoy the same rights and liberties as everybody else. 2. Meaningful work and career—the sense of purpose derived from discovering one's passion for work drives people to achieve goals so far beyond the needs of themselves that they lift all of us to a higher plane, either directly through the benefits of the work, or indirectly through inspiration. And here let me shift my politics slightly rightward to tell you that not only is it okay to make a lot of money, it is a moral virtue to earn your way to wealth and prosperity, and that market capitalism—conjoined with liberal democracy—is the best hope for humanity's future that we have. 3. Recreation and play—it is vital to take time off from work, get away from the office, hang out with your friends, see new places, veg out, goof off, and explore new activities with no purpose other than their shear enjoyment. (In other words, build into your purpose no purpose at all.) 4. Social and political involvement—as a social primate species endowed by evolution with the moral emotions of guilt and pride, shame and joy, we have a social obligation to our local community and our larger society to participate in the process of determining how best we should live together, and a moral duty to reach out and help those in need. Research shows that those who do so are happier and more fulfilled people. 5. Transcendency and spirituality—a capacity unique to our species, as far as we can tell, that includes aesthetic appreciation, spiritual reflection, and transcendent contemplation through a variety of expressions such as art, music, dance, exercise, meditation, prayer, quiet contemplation, and religious revere, connecting us on the deepest level with that which is outside of ourselves.

# Round 4 – Aff v Towson JR

## 1ac

### 1ac v Towson JR

1AC Plan – with S-PRISM

The United States federal government should substantially increase loan guarantees for integral fast reactors using the S-PRISM design.

Proliferation

Advantage 1: Prolif

Nuclear power construction is likely worldwide – Inaction on IFRs is killing US leadership and ability to influence prolif

Shuster 11 [Joseph Shuster, founder of Minnesota Valley Engineering and Chemical Engineer, 9-8-2011, "Response to Draft Report From Obama’s Blue Ribbon Commission (BRC) on America’s Nuclear Future dated July 29, 2011," Beyond Fossil Fools]

Contrary to the commission’s declarations on the matter, the U.S. is in danger of losing its once ¶ strong nuclear leadership. As a result we would have less to say about how nuclear materials are ¶ to be managed in the world and that could expose the U.S. to some inconvenient if not downright ¶ dangerous consequences. China is now building a large pilot plant said to be identical to our ¶ successful EBR-II plant that proved the design of the IFR. Meanwhile in the U.S. after complete ¶ success, EBR II was shut down, not for technical reasons but for political reasons during the ¶ Clinton administration, a decision destined to be one of the worst in our nation’s history.¶ Much of the world is already committed to a nuclear future with some countries eagerly waiting ¶ to license the American version of Generation IV Fast Reactors—the IFR. We still have the best ¶ IFR technology in the world but have squandered much of our lead, partly by allowing a largely ¶ unqualified commission two years of useless deliberation. What we really did was give our ¶ competitors an additional two years to catch up.

IFR restores leadership on nuclear issues – key to contain proliferation

Stanford 10 (Dr George S. Stanford, nuclear reactor physicist, retired from Argonne National Laboratory, "IFR FaD context – the need for U.S. implementation of the IFR," 2/18/10) http://bravenewclimate.com/2010/02/18/ifr-fad-context/-http://bravenewclimate.com/2010/02/18/ifr-fad-context/

ON THE NEED FOR U.S. IMPLEMENTATION OF THE INTEGRAL FAST REACTOR¶ The IFR ties into a very big picture — international stability, prevention of war, and avoiding “proliferation” (spread) of nuclear weapons.¶ – The need for energy is the basis of many wars, including the ones we are engaged in right now (Iraq and Afghanistan). If every nation had enough energy to give its people a decent standard of living, that reason for conflict would disappear.¶ – The only sustainable energy source that can provide the bulk of the energy needed is nuclear power.¶ – The current need is for more thermal reactors — the kind we now use.¶ – But for the longer term, to provide the growing amount of energy that will be needed to maintain civilization, the only proven way available today is with fast-reactor technology.¶ – The most promising fast-reactor type is the IFR – metal-fueled, sodium-cooled, with pyroprocessing to recycle its fuel.¶ – Nobody knows yet how much IFR plants would cost to build and operate. Without the commercial-scale demo of the IFR, along with rationalization of the licensing process, any claims about costs are simply hand-waving guesses.¶ \* \* \* \*¶ Background info on proliferation (of nuclear weapons). Please follow the reasoning carefully.¶ – Atomic bombs can be made with highly enriched uranium (90% U-235) or with good-quality plutonium (bomb designers want plutonium that is ~93% Pu-239).¶ – For fuel for an LWR, the uranium only has to be enriched to 3 or 4% U-235.¶ – To make a uranium bomb you don’t need a reactor — but you do need access to an enrichment facility or some other source of highly enriched uranium…¶ – Any kind of nuclear reactor can be used to make weapons-quality plutonium from uranium-238, but the uranium has to have been irradiated for only a very short period. In other words, nobody would try to make a plutonium weapon from ordinary spent fuel, because there are easier ways to get plutonium of much better quality.¶ – Plutonium for a weapon not only has to have good isotopic quality, it also has to be chemically uncontaminated. Thus the lightly irradiated fuel has to be processed to extract the plutonium in a chemically pure form. But mere possession of a reactor is not sufficient for a weapons capability — a facility using a chemical process called PUREX is also needed.¶ – Regardless of how many reactors a country has, it cannot have a weapons capability unless it has either the ability to enrich uranium or to do PUREX-type fuel reprocessing.¶ – Therefore, the spread of weapons capability will be strongly inhibited if the only enrichment and reprocessing facilities are in countries that already have a nuclear arsenal.¶ – But that can only happen if countries with reactors (and soon that will be most of the nations of the world) have absolutely ironclad guarantees that they can get the fuel they need even if they can’t make their own, regardless of how obnoxious their political actions might be.¶ – Such guarantees will have to be backed up by some sort of international arrangement, and that can only come to pass if there is effective leadership for the laborious international negotiations that will have to take place. (For a relevant discussion, see here)¶ – At present, the only nation that has a realistic potential to be such a leader is the United States.¶ – But a country cannot be such a leader in the political arena unless it is also in the technological forefront.¶ – The United States used to be the reactor-technology leader, but it abandoned that role in 1994 when it terminated the development of the IFR.¶ – Since then, other nations — China, India, Japan, South Korea, Russia, France — have proceeded to work on their own fast-reactor versions, which necessarily will involve instituting a fuel-processing capability.¶ – Thus the United States is being left behind, and is rapidly losing its ability to help assure that the global evolution of the technology of nuclear energy proceeds in a safe and orderly manner.¶ – But maybe it’s not too late yet. After all, the IFR is the fast-reactor technology with the post promise (for a variety of reasons), and is ready for a commercial-scale demonstration to settle some uncertainties about how to scale up the pyroprocess as needed, to establish better limits on the expected cost of production units, and to develop an appropriate, expeditious licensing process.¶ – Such a demo will require federal seed money. It’s time to get moving.

Transition to IFRs create a global proliferation resistant fuel cycle

Stanford 10 (Dr George S. Stanford, nuclear reactor physicist, retired from Argonne National Laboratory, "Q%26A on Integral Fast Reactors – safe, abundant, non-polluting power," 9/18/10) <http://bravenewclimate.com/2010/09/18/ifr-fad-7/-http://bravenewclimate.com/2010/09/18/ifr-fad-7/>

Thermal reactors with reprocessing would do at least a little better.¶ Recycling (it would be with the PUREX process, or an equivalent) could stretch the U-235 supply another few decades—but remember the consequences: growing stockpiles of plutonium, pure plutonium streams in the PUREX plants, and the creation of 100,000-year plutonium mines.¶ If you’re going to talk about “PUREX” and “plutonium mines” you should say what they are. First, what’s PUREX?¶ It’s a chemical process developed for the nuclear weapons program, to separate plutonium from everything else that comes out of a reactor. Weapons require very pure plutonium, and that’s what PUREX delivers. The pyroprocess used in the IFR is very different. It not only does not, it cannot, produce plutonium with the chemical purity needed for weapons.¶ Why do you keep referring to “chemical” purity?¶ Because chemical and isotopic quality are two different things. Plutonium for a weapon has to be pure chemically. Weapons designers also want good isotopic quality—that is, they want at least 93% of their plutonium to consist of the isotope Pu- 239. A chemical process does not separate isotopes.¶ I see. Now, what about the “plutonium mines?”¶ When spent fuel or vitrified reprocessing waste from thermal reactors is buried, the result is a concentrated geological deposit of plutonium. As its radioactivity decays, those deposits are sources of raw material for weapons, becoming increasingly attractive over the next 100,000 years and more (the half-life of Pu-239 being 24,000 years).¶ You listed, back at the beginning, some problems that the IFR would ameliorate. A lot of those problems are obviously related to proliferation of nuclear weapons.¶ Definitely. For instance, although thermal reactors consume more fuel than they produce, and thus are not called “breeders,” they inescapably are prolific breeders of plutonium, as I said. And that poses serious concerns about nuclear proliferation. And proliferation concerns are even greater when fuel from thermal reactors is recycled, since the PUREX method is used. IFRs have neither of those drawbacks.¶ Why does it seem that there is more proliferation-related concern about plutonium than about uranium? Can’t you make bombs from either?¶ Yes. The best isotopes for nuclear explosives are U-235, Pu- 239, and U-233. Only the first two of those, however, have been widely used. All the other actinide isotopes, if present in appreciable quantity, in one way or another complicate the design and construction of bombs and degrade their performance. Adequate isotopic purity is therefore important, and isotopic separation is much more difficult than chemical separation. Even so, with plutonium of almost any isotopic composition it is technically possible to make an explosive (although designers of military weapons demand plutonium that is at least 93% Pu-239), whereas if U-235 is sufficiently diluted with U-238 (which is easy to do and hard to undo), the mixture cannot be used for a bomb.¶ High-quality plutonium is the material of choice for a large and sophisticated nuclear arsenal, while highly enriched uranium would be one of the easier routes to a few crude nuclear explosives.¶ So why the emphasis on plutonium?¶ You’re asking me to read people’s minds, and I’m not good at that. Both uranium and plutonium are of proliferation concern.¶ Where is the best place for plutonium?¶ Where better than in a reactor plant—particularly an IFR facility, where there is never pure plutonium (except some, briefly, when it comes in from dismantled weapons), where the radioactivity levels are lethal, and where the operations are done remotely under an inert, smothering atmosphere? Once enough IFRs are deployed, there never will need to be plutonium outside a reactor plant—except for the then diminishing supply of plutonium left over from decades of thermal-reactor operation.¶ How does the IFR square with U.S. policy of discouraging plutonium production, reprocessing and use?¶ It is entirely consistent with the intent of that policy—to render plutonium as inaccessible for weapons use as possible. The wording of the policy, however, is now obsolete.¶ How so?¶ It was formulated before the IFR’s pyroprocessing and electrorefining technology was known—when “reprocessing” was synonymous with PUREX, which creates plutonium of the chemical purity needed for weapons. Since now there is a fuel cycle that promises to provide far-superior management of plutonium, the policy has been overtaken by events.¶ Why is the IFR better than PUREX? Doesn’t “recycling” mean separation of plutonium, regardless of the method?¶ No, not in the IFR—and that misunderstanding accounts for some of the opposition. The IFR’s pyroprocessing and electrorefining method is not capable of making plutonium that is pure enough for weapons. If a proliferator were to start with IFR material, he or she would have to employ an extra chemical separation step.¶ But there is plutonium in IFRs, along with other fissionable isotopes. Seems to me that a proliferator could take some of that and make a bomb.¶ Some people do say that, but they’re wrong, according to expert bomb designers at Livermore National Laboratory. They looked at the problem in detail, and concluded that plutonium-bearing material taken from anywhere in the IFR cycle was so ornery, because of inherent heat, radioactivity and spontaneous neutrons, that making a bomb with it without chemical separation of the plutonium would be essentially impossible—far, far harder than using today’s reactor-grade plutonium.¶ So? Why wouldn’t they use chemical separation?¶ First of all, they would need a PUREX-type plant—something that does not exist in the IFR cycle.¶ Second, the input material is so fiendishly radioactive that the processing facility would have to be more elaborate than any PUREX plant now in existence. The operations would have to be done entirely by remote control, behind heavy shielding, or the operators would die before getting the job done. The installation would cost millions, and would be very hard to conceal.¶ Third, a routine safeguards regime would readily spot any such modification to an IFR plant, or diversion of highly radioactive material beyond the plant.¶ Fourth, of all the ways there are to get plutonium—of any isotopic quality—this is probably the all-time, hands-down hardest.¶ The Long Term¶ Does the plutonium now existing and being produced by thermal reactors raise any proliferation concerns for the long term?¶ It certainly does. As I said earlier, burying the spent fuel from today’s thermal reactors creates geological deposits of plutonium whose desirability for weapons use is continually improving. Some 30 countries now have thermal-reactor programs, and the number will grow. To conceive of that many custodial programs being maintained effectively for that long is a challenge to the imagination. Since the IFR can consume plutonium, it can completely eliminate this long-term concern.¶ Are there other waste-disposal problems that could be lessened?¶ Yes. Some constituents of the waste from thermal reactors remain appreciably radioactive for thousands of years, leading to 10,000-year stability criteria for disposal sites. Waste disposal would be simpler if that time frame could be shortened. With IFR waste, the time of concern is less than 500 years.¶ What about a 1994 report by the National Academy of Sciences? The Washington Post said that the NAS report “denounces the idea of building new reactors to consume plutonium.”¶ That characterization of the report is a little strong, but it is true that the members of the NAS committee seem not to have been familiar with the plutonium-management potential of the IFR. They did, however, recognize the “plutonium mine” problem. They say (Executive Summary, p.3):¶ Because plutonium in spent fuel or glass logs incorporating high-level wastes still entails a risk of weapons use, and because the barrier to such use diminishes with time as the radioactivity decays, consideration of further steps to reduce the long-term proliferation risks of such materials is required, regardless of what option is chosen for [near-term] disposition of weapons plutonium. This global effort should include continued consideration of more proliferation-resistant nuclear fuel cycles, including concepts that might offer a long-term option for nearly complete elimination of the world’s plutonium stocks. The IFR, obviously, is just such a fuel cycle—a prime candidate for “continued consideration.”

We’re on the brink of rapid prolif – access to tech is inevitable and multilateral institutions fail

CFR 12 [CFR 7-5-2012, "The Global Nuclear Nonproliferation Regime," Council on Foreign Relations]

Nuclear weapons proliferation, whether by state or nonstate actors, poses one of the greatest threats to international security today. Iran's apparent efforts to acquire nuclear weapons, what amounts to North Korean nuclear blackmail, and the revelation of the A.Q. Khan black market nuclear network all underscore the far-from-remote possibility that a terrorist group or a so-called rogue state will acquire weapons of mass destruction or materials for a dirty bomb.¶ The problem of nuclear proliferation is global, and any effective response must also be multilateral. Nine states (China, France, India, Israel, North Korea, Pakistan, Russia, the United Kingdom, and the United States) are known or believed to have nuclear weapons, and more than thirty others (including Japan, Germany, and South Korea) have the technological ability to quickly acquire them. Amid volatile energy costs, the accompanying push to expand nuclear energy, growing concerns about the environmental impact of fossil fuels, and the continued diffusion of scientific and technical knowledge, access to dual-use technologies seems destined to grow.¶ In the background, a nascent global consensus regarding the need for substantial nuclear arms reductions, if not complete nuclear disarmament, has increasingly taken shape. In April 2009, for instance, U.S. president Barack Obama reignited global nonproliferation efforts through a landmark speech in Prague. Subsequently, in September of the same year, the UN Security Council (UNSC) unanimously passed Resolution 1887, which called for accelerated efforts toward total nuclear disarmament. In February 2012, the number of states who have ratified the Comprehensive Test Ban Treaty increased to 157, heightening appeals to countries such as the United States, Israel, and Iran to follow suit.¶ Overall, the existing global nonproliferation regime is a highly developed example of international law. Yet, despite some notable successes, existing multilateral institutions have failed to prevent states such as India, Pakistan, and North Korea from "going nuclear," and seem equally ill-equipped to check Iran as well as potential threats from nonstate, terrorist groups. The current framework must be updated and reinforced if it is to effectively address today's proliferation threats, let alone pave the way for "the peace and security of a world without nuclear weapons."

Proliferation will be rapid and escalate – kills deterrence stability

Horowitz, 2009

[April, Michael, Department of Political Science, University of Pennsylvania, Philadelphia, “The Spread of Nuclear Weapons,” journal of conflict resolution, vol 53, no 2]

Learning as states gain experience with nuclear weapons is complicated. While to some extent, nuclear acquisition might provide information about resolve or capabil-  ities, it also generates uncertainty about the way an actual conflict would go—given  the new risk of nuclear escalation—and uncertainty about relative capabilities. Rapid proliferation may especially heighten uncertainty given the potential for reasonable  states to disagree at times about the quality of the capabilities each possesses.2 What  follows is an attempt to describe the implications of inexperience and incomplete  information on the behavior of nuclear states and their potential opponents over time.  Since it is impossible to detail all possible lines of argumentation and possible  responses, the following discussion is necessarily incomplete. This is a first step.  The acquisition of nuclear weapons increases the confidence of adopters in their  ability to impose costs in the case of a conflict and the expectations of likely costs if  war occurs by potential opponents. The key questions are whether nuclear states  learn over time about how to leverage nuclear weapons and the implications of that  learning, along with whether actions by nuclear states, over time, convey information  that leads to changes in the expectations of their behavior—shifts in uncertainty—  on the part of potential adversaries.  Learning to Leverage?  When a new state acquires nuclear weapons, how does it influence the way the  state behaves and how might that change over time? Although nuclear acquisition  might be orthogonal to a particular dispute, it might be related to a particular secu-  rity challenge, might signal revisionist aims with regard to an enduring dispute, or  might signal the desire to reinforce the status quo.  This section focuses on how acquiring nuclear weapons influences both the new  nuclear state and potential adversaries. In theory, system wide perceptions of nuclear  danger could allow new nuclear states to partially skip the early Cold War learning  process concerning the risks of nuclear war and enter a proliferated world more cog-  nizant of nuclear brinksmanship and bargaining than their predecessors. However,  each new nuclear state has to resolve its own particular civil–military issues surrounding operational control and plan its national strategy in light of its new capa-  bilities. Empirical research by Sagan (1993), Feaver (1992), and Blair (1993)  suggests that viewing the behavior of other states does not create the necessary tacit  knowledge; there is no substitute for experience when it comes to handling a nuclear  arsenal, even if experience itself cannot totally prevent accidents. Sagan contends  that civil–military instability in many likely new proliferators and pressures generated by the requirements to handle the responsibility of dealing with nuclear weapons  will skew decision making toward more offensive strategies (Sagan 1995). The ques-  tions surrounding Pakistan’s nuclear command and control suggest there is no magic  bullet when it comes to new nuclear powers’ making control and delegation decisions (Bowen and Wolvén 1999).  Sagan and others focus on inexperience on the part of new nuclear states as a key  behavioral driver. Inexperienced operators and the bureaucratic desire to “justify”  the costs spent developing nuclear weapons, combined with organizational biases  that may favor escalation to avoid decapitation—the “use it or lose it” mind-set—  may cause new nuclear states to adopt riskier launch postures, such as launch on  warning, or at least be perceived that way by other states (Blair 1993; Feaver 1992;  Sagan 1995).3  Acquiring nuclear weapons could alter state preferences and make states more  likely to escalate disputes once they start, given their new capabilities.4 But their  general lack of experience at leveraging their nuclear arsenal and effectively communicating nuclear threats could mean new nuclear states will be more likely to  select adversaries poorly and to find themselves in disputes with resolved adver-  saries that will reciprocate militarized challenges. The “nuclear experience” logic also suggests that more experienced nuclear states  should gain knowledge over time from nuclearized interactions that helps leaders  effectively identify the situations in which their nuclear arsenals are likely to make  a difference. Experienced nuclear states learn to select into cases in which their com-  parative advantage, nuclear weapons, is more likely to be effective, increasing the  probability that an adversary will not reciprocate.  Coming from a slightly different perspective, uncertainty about the consequences  of proliferation on the balance of power and the behavior of new nuclear states on  the part of their potential adversaries could also shape behavior in similar ways (Schelling 1966; Blainey 1988). While a stable and credible nuclear arsenal communicates clear information about the likely costs of conflict, in the short term,  nuclear proliferation is likely to increase uncertainty about the trajectory of a war,  the balance of power, and the preferences of the adopter.

Prolif is uneven – small arsenals don’t solve

Narang, 12 [VIPIN NARANG is an Assistant Professor of Political Science at MIT and member of MIT's Security Studies Program. He received his Ph.D. from the Department Journal of Conflict Resolution July 9, 2012 0022002712448909, p. sage Journals]

Conclusion¶ These findings have important implications for our understanding of nuclear deterrence and nuclear proliferation. First, they overturn a central belief in international relations and nuclear deterrence theory that the acquisition of even a minimal nuclear capability radically improves a regional state's ability to deter conventional conflict. The Cold War experience left it unclear as to what it precisely takes to deter conflict. The regional nuclear powers, however, which have had to face constrained decisions about how to allocate their deterrent power, illustrate that states must explicitly orient their nuclear forces to deter conventional conflict in order to expe- rience reduced attacks. The mere possession of nuclear weapons or even second- strike forces alone seems incapable of providing systematic deterrence against con- ventional attacks. There is no magical deterrent benefit against conventional conflict generated by existential, catalytic, or assured retaliatory postures.¶ To reap a significant deterrent effect against conventional conflict, regional states must—for better or worse—explicitly orient their nuclear forces to do so by adopting an asymmetric escalation posture. This posture undoubtedly carries with it other sig- nificant risks, such as severe command and control pressures and an attendant increase in the risk of inadvertent nuclear use (Sagan 1995). Furthermore, states with this posture have strong incentives to undermine the so-called nuclear taboo in order to keep their nuclear threats credible and may do so in ways that risk their own, or international, security (Tannenwald 2008). However, the findings in this article pro- vide a strong clue as to why states may be willing to run these risks: the significant deterrence benefit that this posture provides. All of this suggests that, theoretically, scholars should cease treating nuclear weapons states as equivalent. The fact that nuclear powers have adopted widely varying nuclear postures that have radically dif- ferent effects on international conflict calls for a revision to our thinking about how conflict can be deterred with nuclear weapons. ror policy makers, these findings suggest that, in addition to addressing a state s initial march toward nuclear weapons, more attention ought to be paid to how regional states operationalize their nuclear forces once they cross the threshold. If it is nuclear posture, not simply nuclear possession, that generates the patterns of regional conflict around a particular regional nuclear power, practitioners may need to reassess their expectations of the frequency and character of conflict in regions with nuclear powers. It also means that the march toward nuclearization, while important, is not the only process that can be targeted by nonproliferation efforts. Even after a regional power has obtained nuclear weapons, the international commu- nity may be able to shape a state's choice of posture. For example, the perceived availability of the United States as a patron state is critical to the selection of the cat- alytic posture. In other instances, there might also be good reasons and ways to push a regional power that is tempted to adopt an asymmetric escalation posture to adopt an assured retaliation posture instead, and minimize the emphasis it places on nuclear weapons for its day-to-day conventional defense (Sechser and Fuhrmann, n.d.).¶ The fundamental point is that nuclear postures matter. Nuclear weapons may deter, but they deter unequally. Moreover, both theoretically and empirically, it seems to take more to deter conventional conflict than is generally appreciated. This finding ought to influence how we think about the emerging nuclear landscape and about what it means for international conflict.¶

Quantitative analysis shows nuclearization increases conflict risk – South Asia example

Kapur in ‘7 (S. Paul, Associate Prof. Strategic Research Department @ Naval War College, “Dangerous Deterrent: Nuclear Weapons Proliferation and Conflict in South Asia”, p. 169-171)

In this study, I have sought to determine the effects that India's and Pakistan's acquisition of nuclear weapons has had on the South Asian security environment, focusing specifically on proliferation's impact on conventional military stability in the region. I first showed, through a quantitative analysis of the historical record, that a positive correlation exists between progressing nuclear proliferation and militarized disputes in the region. I explained this correlation between proliferation and conventional instability through case studies that closely examined Indo-Pakistani conventional military behavior during three periods of time during the proliferation process: a nonnuclear period from 1972 through 1989; a de facto nuclear period from 1990 through May 1998; and an overt nuclear period from June 1998 through 2002.

I argued that conventional conflict became more frequent and severe as proliferation progressed because of India's and Pakistan's territorial preferences and relative military capabilities. Pakistan's conventional military weakness vis-a-vis India and its revisionist preferences regarding the territorial division of Kashmir created strong incentives for conventional Pakistani aggression. This was the case for two reasons. First, nuclear weapons, by deterring all-out Indian conventional retaliation, enabled the Pakistanis physically to challenge territorial boundaries in Kashmir. Second, the danger of conventional hostilities escalating to the nuclear level drew international attention, potentially enabling Pakistan to secure outside mediation of the Kashmir dispute and to achieve a more favorable territorial settlement in Kashmir than it could have gotten by itself.

India's conventional strength and status quo preferences regarding the territorial division of Kashmir, by contrast, meant that the acquisition of nuclear weapons did not create direct incentives for India to become more conventionally aggressive or to alter its military behavior in any significant manner. This was the case because the Indian government was largely satisfied on the issue of Kashmir and did not seek to alter territorial boundaries in the region. Therefore, the Indians had little motivation to engage in cross-border aggression, with or without nuclear weapons. In addition, because India was conventionally stronger than Pakistan, the acquisition of nuclear weapons did not enable the Indians to undertake any aggression that they could not have launched earlier with purely conventional forces. Thus, we saw increasingly aggressive Pakistani behavior as proliferation progressed, while nuclear weapons did not have much direct impact on Indian behavior—though, by encouraging Pakistani adventurism, nuclear weapons did drive India to adopt increasingly forceful approaches to dealing with Pakistan.

In the case studies, I demonstrated this logic's impact on the Indo-Pakistani security relationship since 1972. Specifically, I showed that the first, nonnuclear time period from 1972 through 1989 was relatively peaceful, with 186 of 216 months completely free of militarized conflict. I argued that this was the case for two main reasons. First, the Indian government was satisfied with the territorial division of the subcontinent after its victory in the Bangladesh War and had no reason to undertake any aggression against Pakistan. Second, although Pakistani leaders were dissatisfied with the division of the subcontinent following the Bangladesh War, in its weakened state, Pakistan could not risk action to alter territorial boundaries and thus generally avoided confrontation with India.

I showed that the second, de facto nuclear time period was considerably more volatile than the nonnuclear period, with militarized disputes occurring over five times more frequently than they did from 1972 through 1989. I argued that this decreased stability resulted largely from Pakistan's support for the anti-Indian insurgency in Kashmir. This involvement in the insurgency was encouraged by Pakistan's de facto nuclear weapons capacity, which enabled Pakistan to pursue a low-intensity conflict strategy in Kashmir while insulated from all-out Indian conventional retaliation.

I showed that during the third, overt nuclear time period, the frequency of militarized Indo-Pakistani disputes increased nearly 14 percent beyond what it had been during the de facto nuclear period. Additionally, conflict during the overt period escalated above the hostility levels reached in either the nonnuclear or the de facto nuclear periods, crossing the threshold of outright war in 1999. I explained that the overt acquisition of nuclear weapons gave the Pakistan government even greater confidence in its ability to alter the territorial status quo in Kashmir through conventional aggression without fear of full-scale Indian retaliation. Furthermore, Pakistani leaders believed that conflict between two openly nuclear powers would attract international attention to and mediation of the Kashmir dispute, possibly resulting in a settlement superior to any that Pakistan could have secured on its own.

The case studies thus explained the positive correlation between progressing nuclear proliferation and increased conventional conflict identified in the first section of this study and made clear the importance of territorial preferences and military capabilities to determining nuclear proliferation's impact on the behavior of new nuclear states. In the sections that follow, I discuss the theoretical and policy implications of these findings.

Solving proliferation can lead to nuclear disarmament

DR. LAWRENCE SCHEINMAN, ASSISTANT DIRECTOR NONPROLIFERATION AND REGIONAL ARMS CONTROL, 3-13-96 http://dosfan.lib.uic.edu/acda/speeches/schein/scheiott.htm

The 1995 NPT Conference decisions reflect the strong interest on the part of NPT non-nuclear-weapon states to see greater progress made toward full implementation of NPT Article VI and, in particular, the achievement of nuclear disarmament. Following the 1995 NPT Conference, the small minority of countries (both within and without the NPT regime) that were not satisfied with the NPT Conference outcome began to agitate publicly for those measures not agreed by the 1995 NPT Review and Extension Conference. They began selectively to reinterpret the Conference decisions and to demand the establishment of certain arms control measures. In a direct challenge to the agenda set forth at the 1995 NPT Conference, these states have called for creation of linkage between important and internationally agreed initiatives, such as a FMCT, and rhetorical and unagreed initiatives, such as creating a time-bound framework for nuclear disarmament. The actions of these few states, including some not party to the NPT, belie the very real cooperative atmosphere that resulted in the agreement to the 1995 NPT Conference decisions as well as the growing de-emphasis on "bloc politics" in favor of national or regional security perspectives. Their actions have undermined efforts to move forward constructively on important arms control initiatives, including the CTBT and FMCT. It has also run counter to stated interest in continuing the constructive dialogue that flourished during the 1995 NPT Conference process. If continued progress is to be made toward mutually shared arms control objectives, such as those outlined in the "Principles and Objectives" decision, it will be essential for these few states to stand down from the kind of approach that has characterized their participation in the arms control debate over the past eight months. Allow me, if you will, to take this point a bit further. Disarmament on demand or timetable disarmament is not a tenable proposition -- rather, it is political grandstanding that blocks out of consideration whether and to what extent the security environment in which disarmament is to take place is conducive to such measures. We live today, and will for some time to come, in a period of transition between a world anchored on two relatively well disciplined superpower alliances which defined the international security order, and a future that is unknown and difficult to map with confidence and which is more likely than not to be characterized by forms of complex multipolarity in which local, regional and transnationalist forces weigh heavily. Building down one security order requires a commensurate building up of alternative orders if stability is to be safeguarded. The goal of the ultimate elimination of nuclear weapons must take this consideration into account. What is critically important at this stage is to engage in a process that moves us inexorably toward that goal but avoids the error of generating expectations that cannot be met, thus feeding the flames of disillusionment and frustration and reinforcing those who would argue against changing the nuclear status quo. This debate over nuclear disarmament presents a continuous challenge, and one that is not easily addressed. The insistence on the part of non-nuclear weapon states for "disarmament on demand" must be reconciled with the reality that achievement of nuclear disarmament will not happen unless and until the international security situation evolves to the point where, in effect, nuclear weapons can be written out of our national security doctrine and strategies. Certainly the international security situation has changed dramatically from the days of the Cold War; U.S. strategic doctrine has evolved in response to this changed security environment and, as we announced in completing our Nuclear Posture Review, nuclear weapons today play a smaller role in U.S. military planning than at any time in the past. The reality, however, is that while much improved, the security situation today continues to present significant threats to the United States and its allies, and to global stability overall.Many states appear unwilling to accept the fact that, in spite of the commitment of the United States and other nuclear weapon states to the elimination of nuclear weapons -- commitments that have been repeatedly reaffirmed and reinforced through the continued progress in nuclear arms reduction -- nuclear disarmament cannot and will not be achieved overnight. Our long experience illustrates the fact that nuclear arms reduction and elimination is a tedious process -- necessarily so. Like it or not, the fact is that the implementation schedule for START I and II -- agreements that already have been negotiated -- will take many years to fulfill. Without getting into a detailed discussion of what this audience already well knows concerning U.S.-Russian nuclear arms control and disarmament measures, let me just say that now that the U.S. Senate has provided its advice and consent to START II our primary concern is achieving consent to ratification by the Russian Duma. Following this, we intend to work with Russia on the deactivation of START II forces. During their September 1994 summit meeting, Presidents Clinton and Yeltsin committed to consider further reductions of, and limitations on, remaining nuclear forces once START II was ratified. In the meantime, implementation of START I is running several years ahead of schedule.

That’s the largest internal link to global structural violence

Biswas 1 [Shampa Biswas, Whitman College Politics Professor, December 2001, “Nuclear apartheid" as political position: race as a postcolonial resource?, Alternatives 26.4]

At one level, as Partha Chatterjee has pointed out, the concept of apartheid relates to a discourse about "democracy." (49) To use apartheid to designate the unequal distribution of nuclear resources then is also simultaneously to draw attention to the undemocratic character of international relations--or, more literally, the exclusion of a group of people from some kind of legitimate and just entitlement. More specifically, to talk in terms of nuclear haves and have-nots is to talk in terms of a concept of democratic justice based on the "possession" (or lack thereof) of something. "Apartheid," as Sumit Sarkar points out, "implies as its valorised Other a notion of equal rights." (50) But that this something is "nuclear weapons" complicates the issue a great deal. If the vision of democracy that is implicit in the concept of nuclear apartheid implies a world of "equal possession" of nuclear weapons, a position implied in the Indian decision to test, that is a frightening thought indeed. Yet surely even India does not subscribe to that vision of democracy. "Would India," asks Sarkar, "welcome a nuclearised Nepal or Bangladesh?" (51) If Jaswant Singh is serious that "the country"s national security in a world of nuclear proliferation lies either in global disarmament or in exercise of the principle of equal and legitimate security for all," (52) then it should indeed support the "equal and legitimate" nuclearization of its neighbors, which is extremely unlikely given its own demonstrated hegemonic aspirations in the South Asian region. (53) Further, if India does indeed now sign the NPT and the CTBT, and sign them in the garb of a nuclear power as it wants to do, what does that say about its commitment to nuclear democracy? Even if India and Pakistan were to be included in the treaties as NWSs, all that would do is expand the size of the categories, not delegitimize the unequal privileges and burdens written into the categories themselves. ¶ Indian military scientists claim that India has now accumulated enough data for reliable future weaponization without explosive testing, and Indian leaders have, since the tests, indicated more willingness to sign the CTBT. India has already voluntarily accepted restraints on the exports of nuclear-related materials, as required by the NPT. According to an Indian strategic analyst with respect to negotiation of the Fissile Material Cut-Off Treaty, the next major arms-control treaty to be discussed in the Conference on Disarmament, "The key question in relation to the FMCT is not if it is global and nondiscriminatory. It is whether India has sufficient nuclear material at hand to maintain a credible nuclear deterrent." (54) If all India ever wanted was to move from the side of the discriminated to the side of the discriminators, so much for speaking for democratic ideals through the symbol of nuclear apartheid. (55) ¶ There are several troublesome issues here with respect to the concept of "nuclear democracy." On the one hand, it seems clear that the widespread proliferation of nuclear weapons sits ill at ease with any notion of democratic entitlement. It seems that rather than equalizing the possession of nuclear weapons, it would be equalizing the dispossession of nuclear weapons that entails a more compelling democratic logic. (56) On the other hand, there is also the question of the fundamentally undemocratic nature of nuclear weapons themselves. At one level, the sheer scope of such weapons to kill and destroy indiscriminately (a democratic logic here?) renders any laws of 'just war" moot. As Braful Bidwai and Achin Vanaik point out, the very use of nuclear weapons would be to break the principle of proportionate use of force, and such weapons clearly cannot be made to distinguish between combatants and noncombatants as required in the just conduct of war. (57) ¶ In this context, it might be worth pointing to the 1996 ruling by the International Court of Justice at the Hague that stipulated that the "the threat or use of nuclear weapons would generally be contrary to the rules of international law applicable in armed conflict and, in particular, the principles and rules of humanitarian law." (58) If the regulation of war can be considered a democratic exercise, then nuclear weapons by their very nature make that exercise futile. At another level is the secrecy that has historically and perhaps necessarily accompanied the development of nuclear-weapons programs, relegated to an aspect of the national-security state that is immunized from democratic scrutiny. Chatterjee argues that nuclear weapons involve a technology that is intrinsically undemocratic -- both domestically and internationally -- since the enormous destructive potential that they embody requires a great deal of secrecy and inaccessibility. (59) Itty Abraham's excellent analysis shows how the intertwined emergence of the independent Indian state and the atomic-energy establishment legally foreclosed the democratic and institutional oversight of the entire atomic-energy enterprise because of its proximity to national security. In other words, the state sponsorship and control of nuclear science, and indeed its constitution in and through nuclear science, makes both science and the state susceptible to undemocratic governance. (60)

Warming

Warming is real and anthropogenic – carbon dioxide increase, polar ice records, melting glaciers, sea level rise

Prothero 12 [Donald R. Prothero, Professor of Geology at Occidental College and Lecturer in Geobiology at the California Institute of Technology, 3-1-2012, "How We Know Global Warming is Real and Human Caused," Skeptic, vol 17 no 2, EBSCO]

Converging Lines of Evidence¶ How do we know that global warming is real and primarily human caused? There are numerous lines of evidence that converge toward this conclusion.¶ 1. Carbon Dioxide Increase.¶ Carbon dioxide in our atmosphere has increased at an unprecedented rate in the past 200 years. Not one data set collected over a long enough span of time shows otherwise. Mann et al. (1999) compiled the past 900 years' worth of temperature data from tree rings, ice cores, corals, and direct measurements in the past few centuries, and the sudden increase of temperature of the past century stands out like a sore thumb. This famous graph is now known as the "hockey stick" because it is long and straight through most of its length, then bends sharply upward at the end like the blade of a hockey stick. Other graphs show that climate was very stable within a narrow range of variation through the past 1000, 2000, or even 10,000 years since the end of the last Ice Age. There were minor warming events during the Climatic Optimum about 7000 years ago, the Medieval Warm Period, and the slight cooling of the Little Ice Age in die 1700s and 1800s. But the magnitude and rapidity of the warming represented by the last 200 years is simply unmatched in all of human history. More revealing, die timing of this warming coincides with the Industrial Revolution, when humans first began massive deforestation and released carbon dioxide into the atmosphere by burning an unprecedented amount of coal, gas, and oil.¶ 2. Melting Polar Ice Caps.¶ The polar icecaps are thinning and breaking up at an alarming rate. In 2000, my former graduate advisor Malcolm McKenna was one of the first humans to fly over the North Pole in summer time and see no ice, just open water. The Arctic ice cap has been frozen solid for at least the past 3 million years (and maybe longer),4 but now the entire ice sheet is breaking up so fast that by 2030 (and possibly sooner) less than half of the Arctic will be ice covered in the summer.5 As one can see from watching the news, this is an ecological disaster for everything that lives up there, from the polar bears to the seals and walruses to the animals they feed upon, to the 4 million people whose world is melting beneath their feet. The Antarctic is thawing even faster. In February-March 2002, the Larsen B ice shelf - over 3000 square km (the size of Rhode Island) and 220 m (700 feet) thick- broke up in just a few months, a story typical of nearly all the ice shelves in Antarctica. The Larsen B shelf had survived all the previous ice ages and interglacial warming episodes over the past 3 million years, and even the warmest periods of the last 10,000 years- yet it and nearly all the other thick ice sheets on the Arctic, Greenland, and Antarctic are vanishing at a rate never before seen in geologic history.¶ 3. Melting Glaciers.¶ Glaciers are all retreating at the highest rates ever documented. Many of those glaciers, along with snow melt, especially in the Himalayas, Andes, Alps, and Sierras, provide most of the freshwater that the populations below the mountains depend upon - yet this fresh water supply is vanishing. Just think about the percentage of world's population in southern Asia (especially India) that depend on Himalayan snowmelt for their fresh water. The implications are staggering. The permafrost that once remained solidly frozen even in the summer has now Üiawed, damaging the Inuit villages on the Arctic coast and threatening all our pipelines to die North Slope of Alaska. This is catastrophic not only for life on the permafrost, but as it thaws, the permafrost releases huge amounts of greenhouse gases which are one of the major contributors to global warming. Not only is the ice vanishing, but we have seen record heat waves over and over again, killing thousands of people, as each year joins the list of the hottest years on record. (2010 just topped that list as the hottest year, surpassing the previous record in 2009, and we shall know about 2011 soon enough). Natural animal and plant populations are being devastated all over the globe as their environments change.6 Many animals respond by moving their ranges to formerly cold climates, so now places that once did not have to worry about disease-bearing mosquitoes are infested as the climate warms and allows them to breed further north.¶ 4. Sea Level Rise.¶ All that melted ice eventually ends up in the ocean, causing sea levels to rise, as it has many times in the geologic past. At present, the sea level is rising about 3-4 mm per year, more than ten times the rate of 0.10.2 mm/year that has occurred over the past 3000 years. Geological data show Üiat ttie sea level was virtually unchanged over the past 10,000 years since the present interglacial began. A few mm here or there doesn't impress people, until you consider that the rate is accelerating and that most scientists predict sea levels will rise 80-130 cm in just the next century. A sea level rise of 1.3 m (almost 4 feet) would drown many of the world's low-elevation cities, such as Venice and New Orleans, and low-lying countries such as the Netherlands or Bangladesh. A number of tiny island nations such as Vanuatu and the Maldives, which barely poke out above the ocean now, are already vanishing beneath the waves. Eventually their entire population will have to move someplace else.7 Even a small sea level rise might not drown all these areas, but they are much more vulnerable to the large waves of a storm surge (as happened with Hurricane Katrina), which could do much more damage than sea level rise alone. If sea level rose by 6 m (20 feet), most of die world's coastal plains and low-lying areas (such as the Louisiana bayous, Florida, and most of the world's river deltas) would be drowned.¶ Most of the world's population lives in lowelevation coastal cities such as New York, Boston, Philadelphia, Baltimore, Washington, D.C., Miami, and Shanghai. All of those cities would be partially or completely under water with such a sea level rise. If all the glacial ice caps melted completely (as they have several times before during past greenhouse episodes in the geologic past), sea level would rise by 65 m (215 feet)! The entire Mississippi Valley would flood, so you could dock an ocean liner in Cairo, Illinois. Such a sea level rise would drown nearly every coastal region under hundreds of feet of water, and inundate New York City, London and Paris. All that would remain would be the tall landmarks such as the Empire State Building, Big Ben, and the Eiffel Tower. You could tie your boats to these pinnacles, but the rest of these drowned cities would lie deep underwater.

Warming is real and causes mass extinction

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As horrifying as the scenario of human extinction by sudden, fast-burning nuclear fire may seem, the one consolation is that this future can be avoided within a relatively short period of time if responsible world leaders change Cold War thinking to move away from aggressive wars over natural resources and towards the eventual dismantlement of most if not all nuclear weapons. On the other hand, another scenario of human extinction by fire is one that may not so easily be reversed within a short period of time because it is not a fast-burning fire; rather, a slow burning fire is gradually heating up the planet as industrial civilization progresses and develops globally. This gradual process and course is long-lasting; thus it cannot easily be changed, even if responsible world leaders change their thinking about ‘‘progress’’ and industrial development based on the burning of fossil fuels. The way that global warming will impact humanity in the future has often been depicted through the analogy of the proverbial frog in a pot of water who does not realize that the temperature of the water is gradually rising. Instead of trying to escape, the frog tries to adjust to the gradual temperature change; finally, the heat of the water sneaks up on it until it is debilitated. Though it finally realizes its predicament and attempts to escape, it is too late; its feeble attempt is to no avail— and the frog dies. Whether this fable can actually be applied to frogs in heated water or not is irrelevant; it still serves as a comparable scenario of how the slow burning fire of global warming may eventually lead to a runaway condition and take humanity by surprise. Unfortunately, by the time the politicians finally all agree with the scientific consensus that global warming is indeed human caused, its development could be too advanced to arrest; the poor frog has become too weak and enfeebled to get himself out of hot water. The Intergovernmental Panel of Climate Change (IPCC) was established in 1988 by the WorldMeteorological Organization (WMO) and the United Nations Environmental Programme to ‘‘assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of humaninduced climate change, its potential impacts and options for adaptation and mitigation.’’[16]. Since then, it has given assessments and reports every six or seven years. Thus far, it has given four assessments.13 With all prior assessments came attacks fromsome parts of the scientific community, especially by industry scientists, to attempt to prove that the theory had no basis in planetary history and present-day reality; nevertheless, as more andmore research continually provided concrete and empirical evidence to confirm the global warming hypothesis, that it is indeed human-caused, mostly due to the burning of fossil fuels, the scientific consensus grew stronger that human induced global warming is verifiable. As a matter of fact, according to Bill McKibben [17], 12 years of ‘‘impressive scientific research’’ strongly confirms the 1995 report ‘‘that humans had grown so large in numbers and especially in appetite for energy that they were now damaging the most basic of the earth’s systems—the balance between incoming and outgoing solar energy’’; ‘‘. . . their findings have essentially been complementary to the 1995 report – a constant strengthening of the simple basic truth that humans were burning too much fossil fuel.’’ [17]. Indeed, 12 years later, the 2007 report not only confirms global warming, with a stronger scientific consensus that the slow burn is ‘‘very likely’’ human caused, but it also finds that the ‘‘amount of carbon in the atmosphere is now increasing at a faster rate even than before’’ and the temperature increases would be ‘‘considerably higher than they have been so far were it not for the blanket of soot and other pollution that is temporarily helping to cool the planet.’’ [17]. Furthermore, almost ‘‘everything frozen on earth is melting. Heavy rainfalls are becoming more common since the air is warmer and therefore holds more water than cold air, and ‘cold days, cold nights and frost have become less frequent, while hot days, hot nights, and heat waves have become more frequent.’’ [17]. Unless drastic action is taken soon, the average global temperature is predicted to rise about 5 degrees this century, but it could rise as much as 8 degrees. As has already been evidenced in recent years, the rise in global temperature is melting the Arctic sheets. This runaway polar melting will inflict great damage upon coastal areas, which could be much greater than what has been previously forecasted. However, what is missing in the IPCC report, as dire as it may seem, is sufficient emphasis on the less likely but still plausible worst case scenarios, which could prove to have the most devastating, catastrophic consequences for the long-term future of human civilization. In other words, the IPCC report places too much emphasis on a linear progression that does not take sufficient account of the dynamics of systems theory, which leads to a fundamentally different premise regarding the relationship between industrial civilization and nature. As a matter of fact, as early as the 1950s, Hannah Arendt [18] observed this radical shift of emphasis in the human-nature relationship, which starkly contrasts with previous times because the very distinction between nature and man as ‘‘Homo faber’’ has become blurred, as man no longer merely takes from nature what is needed for fabrication; instead, he now acts into nature to augment and transform natural processes, which are then directed into the evolution of human civilization itself such that we become a part of the very processes that we make. The more human civilization becomes an integral part of this dynamic system, the more difficult it becomes to extricate ourselves from it. As Arendt pointed out, this dynamism is dangerous because of its unpredictability. Acting into nature to transform natural processes brings about an . . . endless new change of happenings whose eventual outcome the actor is entirely incapable of knowing or controlling beforehand. The moment we started natural processes of our own - and the splitting of the atom is precisely such a man-made natural process -we not only increased our power over nature, or became more aggressive in our dealings with the given forces of the earth, but for the first time have taken nature into the human world as such and obliterated the defensive boundaries between natural elements and the human artifice by which all previous civilizations were hedged in’’ [18]. So, in as much as we act into nature, we carry our own unpredictability into our world; thus, Nature can no longer be thought of as having absolute or iron-clad laws. We no longer know what the laws of nature are because the unpredictability of Nature increases in proportion to the degree by which industrial civilization injects its own processes into it; through selfcreated, dynamic, transformative processes, we carry human unpredictability into the future with a precarious recklessness that may indeed end in human catastrophe or extinction, for elemental forces that we have yet to understand may be unleashed upon us by the very environment that we experiment with. Nature may yet have her revenge and the last word, as the Earth and its delicate ecosystems, environment, and atmosphere reach a tipping point, which could turn out to be a point of no return. This is exactly the conclusion reached by the scientist, inventor, and author, James Lovelock. The creator of the wellknown yet controversial Gaia Theory, Lovelock has recently written that it may be already too late for humanity to change course since climate centers around the world, . . . which are the equivalent of the pathology lab of a hospital, have reported the Earth’s physical condition, and the climate specialists see it as seriously ill, and soon to pass into a morbid fever that may last as long as 100,000 years. I have to tell you, as members of the Earth’s family and an intimate part of it, that you and especially civilisation are in grave danger. It was ill luck that we started polluting at a time when the sun is too hot for comfort. We have given Gaia a fever and soon her condition will worsen to a state like a coma. She has been there before and recovered, but it took more than 100,000 years. We are responsible and will suffer the consequences: as the century progresses, the temperature will rise 8 degrees centigrade in temperate regions and 5 degrees in the tropics. Much of the tropical land mass will become scrub and desert, and will no longer serve for regulation; this adds to the 40 per cent of the Earth’s surface we have depleted to feed ourselves. . . . Curiously, aerosol pollution of the northern hemisphere reduces global warming by reflecting sunlight back to space. This ‘global dimming’ is transient and could disappear in a few days like the smoke that it is, leaving us fully exposed to the heat of the global greenhouse. We are in a fool’s climate, accidentally kept cool by smoke, and before this century is over billions of us will die and the few breeding pairs of people that survive will be in the Arctic where the climate remains tolerable. [19] Moreover, Lovelock states that the task of trying to correct our course is hopelessly impossible, for we are not in charge. It is foolish and arrogant to think that we can regulate the atmosphere, oceans and land surface in order to maintain the conditions right for life. It is as impossible as trying to regulate your own temperature and the composition of your blood, for those with ‘‘failing kidneys know the never-ending daily difficulty of adjusting water, salt and protein intake. The technological fix of dialysis helps, but is no replacement for living healthy kidneys’’ [19]. Lovelock concludes his analysis on the fate of human civilization and Gaia by saying that we will do ‘‘our best to survive, but sadly I cannot see the United States or the emerging economies of China and India cutting back in time, and they are the main source of emissions. The worst will happen and survivors will have to adapt to a hell of a climate’’ [19]. Lovelock’s forecast for climate change is based on a systems dynamics analysis of the interaction between humancreated processes and natural processes. It is a multidimensional model that appropriately reflects the dynamism of industrial civilization responsible for climate change. For one thing, it takes into account positive feedback loops that lead to ‘‘runaway’’ conditions. This mode of analysis is consistent  with recent research on how ecosystems suddenly disappear. A 2001 article in Nature, based on a scientific study by an international consortium, reported that changes in ecosystems are not just gradual but are often sudden and catastrophic [20]. Thus, a scientific consensus is emerging (after repeated studies of ecological change) that ‘‘stressed ecosystems, given the right nudge, are capable of slipping rapidly from a seemingly steady state to something entirely different,’’ according to Stephen Carpenter, a limnologist at the University of Wisconsin-Madison (who is also a co-author of the report). Carpenter continues, ‘‘We realize that there is a common pattern we’re seeing in ecosystems around the world, . . . Gradual changes in vulnerability accumulate and eventually you get a shock to the system - a flood or a drought - and, boom, you’re over into another regime. It becomes a self-sustaining collapse.’’ [20]. If ecosystems are in fact mini-models of the system of the Earth, as Lovelock maintains, then we can expect the same kind of behavior. As Jonathon Foley, a UW-Madison climatologist and another co-author of the Nature report, puts it, ‘‘Nature isn’t linear. Sometimes you can push on a system and push on a system and, finally, you have the straw that breaks the camel’s back.’’ Also, once the ‘‘flip’’ occurs, as Foley maintains, then the catastrophic change is ‘‘irreversible.’’ [20]. When we expand this analysis of ecosystems to the Earth itself, it’s frightening. What could be the final push on a stressed system that could ‘‘break the camel’s back?’’ Recently, another factor has been discovered in some areas of the arctic regions, which will surely compound the problem of global ‘‘heating’’ (as Lovelock calls it) in unpredictable and perhaps catastrophic ways. This disturbing development, also reported in Nature, concerns the permafrost that has locked up who knows how many tons of the greenhouse gasses, methane and carbon dioxide. Scientists are particularly worried about permafrost because, as it thaws, it releases these gases into the atmosphere, thus, contributing and accelerating global heating. It is a vicious positive feedback loop that compounds the prognosis of global warming in ways that could very well prove to be the tipping point of no return. Seth Borenstein of the Associated Press describes this disturbing positive feedback loop of permafrost greenhouse gasses, as when warming ‘‘. already under way thaws permafrost, soil that has been continuously frozen for thousands of years. Thawed permafrost releases methane and carbon dioxide. Those gases reach the atmosphere and help trap heat on Earth in the greenhouse effect. The trapped heat thaws more permafrost and so on.’’ [21]. The significance and severity of this problem cannot be understated since scientists have discovered that ‘‘the amount of carbon trapped in this type of permafrost called ‘‘yedoma’’ is much more prevalent than originally thought and may be 100 times [my emphasis] the amount of carbon released into the air each year by the burning of fossil fuels’’ [21]. Of course, it won’t come out all at once, at least by time as we commonly reckon it, but in terms of geological time, the ‘‘several decades’’ that scientists say it will probably take to come out can just as well be considered ‘‘all at once.’’ Surely, within the next 100 years, much of the world we live in will be quite hot and may be unlivable, as Lovelock has predicted. Professor Ted Schuur, a professor of ecosystem ecology at the University of Florida and co-author of the study that appeared in Science, describes it as a ‘‘slow motion time bomb.’’ [21]. Permafrost under lakes will be released as methane while that which is under dry ground will be released as carbon dioxide. Scientists aren’t sure which is worse. Whereas methane is a much more powerful agent to trap heat, it only lasts for about 10 years before it dissipates into carbon dioxide or other chemicals. The less powerful heat-trapping agent, carbon dioxide, lasts for 100 years [21]. Both of the greenhouse gasses present in permafrost represent a global dilemma and challenge that compounds the effects of global warming and runaway climate change. The scary thing about it, as one researcher put it, is that there are ‘‘lots of mechanisms that tend to be self-perpetuating and relatively few that tend to shut it off’’ [21].14 In an accompanying AP article, Katey Walters of the University of Alaska at Fairbanks describes the effects as ‘‘huge’’ and, unless we have a ‘‘major cooling,’’ - unstoppable [22]. Also, there’s so much more that has not even been discovered yet, she writes: ‘‘It’s coming out a lot and there’s a lot more to come out.’’ [22]. 4. Is it the end of human civilization and possible extinction of humankind? What Jonathon Schell wrote concerning death by the fire of nuclear holocaust also applies to the slow burning death of global warming: Once we learn that a holocaust might lead to extinction, we have no right to gamble, because if we lose, the game will be over, and neither we nor anyone else will ever get another chance. Therefore, although, scientifically speaking, there is all the difference in the world between the mere possibility that a holocaust will bring about extinction and the certainty of it, morally they are the same, and we have no choice but to address the issue of nuclear weapons as though we knew for a certainty that their use would put an end to our species [23].15 When we consider that beyond the horror of nuclear war, another horror is set into motion to interact with the subsequent nuclear winter to produce a poisonous and super heated planet, the chances of human survival seem even smaller. Who knows, even if some small remnant does manage to survive, what the poisonous environmental conditions would have on human evolution in the future. A remnant of mutated, sub-human creatures might survive such harsh conditions, but for all purposes, human civilization has been destroyed, and the question concerning human extinction becomes moot. Thus, we have no other choice but to consider the finality of it all, as Schell does: ‘‘Death lies at the core of each person’s private existence, but part of death’s meaning is to be found in the fact that it occurs in a biological and social world that survives.’’ [23].16 But what if the world itself were to perish, Schell asks. Would not it bring about a sort of ‘‘second death’’ – the death of the species – a possibility that the vast majority of the human race is in denial about? Talbot writes in the review of Schell’s book that it is not only the ‘‘death of the species, not just of the earth’s population on doomsday, but of countless unborn generations. They would be spared literal death but would nonetheless be victims . . .’’ [23]. That is the ‘‘second death’’ of humanity – the horrifying, unthinkable prospect that there are no prospects – that there will be no future. In the second chapter of Schell’s book, he writes that since we have not made a positive decision to exterminate ourselves but instead have ‘‘chosen to live on the edge of extinction, periodically lunging toward the abyss only to draw back at the last second, our situation is one of uncertainty and nervous insecurity rather than of absolute hopelessness.’’ [23].17 In other words, the fate of the Earth and its inhabitants has not yet been determined. Yet time is not on our side. Will we relinquish the fire and our use of it to dominate the Earth and each other, or will we continue to gamble with our future at this game of Russian roulette while time increasingly stacks the cards against our chances of survival?

And warming disproportionately affects the global South

Carrington 11 – Head of the environment at The Guardian (Damian, “Map reveals stark divide in who caused climate change and who's being hit”, http://www.guardian.co.uk/environment/damian-carrington-blog/2011/oct/26/climate-change-developing-country-impacts-risk?CMP=twt\_gu, October 26th, 2011, KTOP)

When the world's nations convene in Durban in November in the latest attempt to inch towards a global deal to tackle climate change, one fundamental principle will, as ever, underlie the negotiations. Is is the contention that while rich, industrialised nations caused climate change through past carbon emissions, it is the developing world that is bearing the brunt. It follows from that, developing nations say, that the rich nations must therefore pay to enable the developing nations to both develop cleanly and adapt to the impacts of global warming. The point is starkly illustrated in a new map of climate vulnerability (above): the rich global north has low vulnerability, the poor global south has high vulnerability. The map is produced by risk analysts Maplecroft by combining measures of the risk of climate change impacts, such as storms, floods, and droughts, with the social and financial ability of both communities and governments to cope. The top three most vulnerable nations reflect all these factors: Haiti, Bangladesh, Zimbabwe. But it is not until you go all the way down 103 on the list, out of 193 nations, that you encounter the first major developed nation: Greece. The first 102 nations are all developing ones. Italy is next, at 124, and like Greece ranks relatively highly due to the risk of drought. The UK is at 178 and the country on Earth least vulnerable to climate change, according to Maplecroft, is Iceland. "Large areas of north America and northern Europe are not so exposed to actual climate risk, and are very well placed to deal with it," explains Charlie Beldon, principal analyst at Maplecroft. The vulnerability index has been calculated down to a resolution of 25km2 and Beldon says at this scale the vulnerability of the developing world's fast growing cities becomes clear. "A lot of big cities have developed in exposed areas such as flood plains, such as in south east Asia, and in developing economies they so don't have the capacity to adapt." Of the world's 20 fastest growing cities, six are classified as 'extreme risk' by Maplecroft, including Calcutta in India, Manila in the Philippines, Jakarta in Indonesia and Dhaka and Chittagong in Bangladesh. Addis Ababa in Ethiopia also features. A further 10 are rated as 'high risk' including Guangdong, Mumbai, Delhi, Chennai, Karachi and Lagos. "Cities such as Manila, Jakarta and Calcutta are vital centres of economic growth in key emerging markets, but heat waves, flooding, water shortages and increasingly severe and frequent storm events may well increase as climate changes takes hold," says Beldon. With the world on the verge of a population of seven billion people, the rapid urbanisation of many developing countries remains one of the major demographic trends, but piles on risk because of the higher pressure on resources, such as water, and city infrastructure, like roads and hospitals.

The IFR is the only way to reduce coal emissions sufficiently to avert the worst climate disasters

Kirsch 9 (Steve Kirsch, Bachelor of Science and a Master of Science in electrical engineering and computer science from the Massachusetts Institute of Technology, American serial entrepreneur who has started six companies: Mouse Systems, Frame Technology, Infoseek, Propel, Abaca, and OneID, "Why We Should Build an Integral Fast Reactor Now," 11/25/9) http://skirsch.wordpress.com/2009/11/25/ifr/

To prevent a climate disaster, we must eliminate virtually all coal plant emissions worldwide in 25 years. The best way and, for all practical purposes, the only way to get all countries off of coal is not with coercion; it is to make them want to replace their coal burners by giving them a plug-compatible technology that is less expensive. The IFR can do this. It is plug-compatible with the burners in a coal plant (see Nuclear Power: Going Fast). No other technology can upgrade a coal plant so it is greenhouse gas free while reducing operating costs at the same time. In fact, no other technology can achieve either of these goals. The IFR can achieve both.¶ The bottom line is that without the IFR (or a yet-to-be-invented technology with similar ability to replace the coal burner with a cheaper alternative), it is unlikely that we’ll be able to keep CO2 under 450 ppm.¶ Today, the IFR is the only technology with the potential to displace the coal burner. That is why restarting the IFR is so critical and why Jim Hansen has listed it as one of the top five things we must do to avert a climate disaster.[4]¶ Without eliminating virtually all coal emissions by 2030, the sum total of all of our other climate mitigation efforts will be inconsequential. Hansen often refers to the near complete phase-out of carbon emissions from coal plants worldwide by 2030 as the sine qua non for climate stabilization (see for example, the top of page 6 in his August 4, 2008 trip report).¶ To stay under 450ppm, we would have to install about 13,000 GWe of new carbon-free power over the next 25 years. That number was calculated by Nathan Lewis of Caltech for the Atlantic, but others such as Saul Griffith have independently derived a very similar number and White House Science Advisor John Holdren used 5,600 GWe to 7,200 GWe in his presentation to the Energy Bar Association Annual Meeting on April 23, 2009. That means that if we want to save the planet, we must install more than 1 GWe per day of clean power every single day for the next 25 years. That is a very, very tough goal. It is equivalent to building one large nuclear reactor per day, or 1,500 huge wind turbines per day, or 80,000 37 foot diameter solar dishes covering 100 square miles every day, or some linear combination of these or other carbon free power generation technologies. Note that the required rate is actually higher than this because Hansen and Rajendra Pachauri, the chair of the IPCC, now both agree that 350ppm is a more realistic “not to exceed” number (and we’ve already exceeded it).¶ Today, we are nowhere close to that installation rate with renewables alone. For example, in 2008, the average power delivered by solar worldwide was only 2 GWe (which is to be distinguished from the peak solar capacity of 13.4GWe). That is why every renewable expert at the 2009 Aspen Institute Environment Forum agreed that nuclear must be part of the solution. Al Gore also acknowledges that nuclear must play an important role.¶ Nuclear has always been the world’s largest source of carbon free power. In the US, for example, even though we haven’t built a new nuclear plant in the US for 30 years, nuclear still supplies 70% of our clean power!¶ Nuclear can be installed very rapidly; much more rapidly than renewables. For example, about two thirds of the currently operating 440 reactors around the world came online during a 10 year period between 1980 and 1990. So our best chance of meeting the required installation of new power goal and saving the planet is with an aggressive nuclear program.¶ Unlike renewables, nuclear generates base load power, reliably, regardless of weather. Nuclear also uses very little land area. It does not require the installation of new power lines since it can be installed where the power is needed. However, even with a very aggressive plan involving nuclear, it will still be extremely difficult to install clean power fast enough.¶ Unfortunately, even in the US, we have no plan to install the clean power we need fast enough to save the planet. Even if every country were to agree tomorrow to completely eliminate their coal plant emissions by 2030, how do we think they are actually going to achieve that? There is no White House plan that explains this. There is no DOE plan. There is no plan or strategy. The deadlines will come and go and most countries will profusely apologize for not meeting their goals, just like we have with most of the signers of the Kyoto Protocol today. Apologies are nice, but they will not restore the environment.¶ We need a strategy that is believable, practical, and affordable for countries to adopt. The IFR offers our best hope of being a centerpiece in such a strategy because it the only technology we know of that can provide an economically compelling reason to change.¶ At a speech at MIT on October 23, 2009, President Obama said “And that’s why the world is now engaged in a peaceful competition to determine the technologies that will power the 21st century. … The nation that wins this competition will be the nation that leads the global economy. I am convinced of that. And I want America to be that nation, it’s that simple.”¶ Nuclear is our best clean power technology and the IFR is our best nuclear technology. The Gen IV International Forum (GIF) did a study in 2001-2002 of 19 different reactor designs on 15 different criteria and 24 metrics. The IFR ranked #1 overall. Over 242 experts from around the world participated in the study. It was the most comprehensive evaluation of competitive nuclear designs ever done. Top DOE nuclear management ignored the study because it didn’t endorse the design the Bush administration wanted.¶ The IFR has been sitting on the shelf for 15 years and the DOE currently has no plans to change that.¶ How does the US expect to be a leader in clean energy by ignoring our best nuclear technology? Nobody I’ve talked to has been able to answer that question.¶ We have the technology (it was running for 30 years before we were ordered to tear it down). And we have the money: The Recovery Act has $80 billion dollars. Why aren’t we building a demo plant?¶ IFRs are better than conventional nuclear in every dimension. Here are a few:¶ Efficiency: IFRs are over 100 times more efficient than conventional nuclear. It extracts nearly 100% of the energy from nuclear material. Today’s nuclear reactors extract less than 1%. So you need only 1 ton of actinides each year to feed an IFR (we can use existing nuclear waste for this), whereas you need 100 tons of freshly mined uranium each year to extract enough material to feed a conventional nuclear plant.¶ Unlimited power forever: IFRs can use virtually any actinide for fuel. Fast reactors with reprocessing are so efficient that even if we restrict ourselves to just our existing uranium resources, we can power the entire planet forever (the Sun will consume the Earth before we run out of material to fuel fast reactors). If we limited ourselves to using just our DU “waste” currently in storage, then using the IFR we can power the US for over 1,500 years without doing any new mining of uranium.[5]¶ Exploits our largest energy resource: In the US, there is 10 times as much energy in the depleted uranium (DU) that is just sitting there as there is coal in the ground. This DU waste is our largest natural energy resource…but only if we have fast reactors. Otherwise, it is just waste. With fast reactors, virtually all our nuclear waste (from nuclear power plants, leftover from enrichment, and from decommissioned nuclear weapons)[6] becomes an energy asset worth about $30 trillion dollars…that’s not a typo…$30 trillion, not billion.[7] An 11 year old child was able to determine this from publicly available information in 2004.

Alternative methods can’t solve warming

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The ship is sinking slowly and we are quickly running out of time to develop and implement any such plan if we are to have any hope of saving the planet. What we need is a plan we can all believe in. A plan where our country's smartest people all nod their heads in agreement and say, "Yes, this is a solid, viable plan for keeping CO2 levels from touching 425ppm and averting a global climate catastrophe."¶ ¶ At his Senate testimony a few days ago, noted climate scientist James Hansen made it crystal clear once again that the only way to avert an irreversible climate meltdown and save the planet is to phase out virtually all coal plants worldwide over a 20 year period from 2010 to 2030. Indeed, if we don't virtually eliminate the use of coal worldwide, everything else we do will be as effective as re-arranging deck chairs on the Titanic.¶ ¶ Plans that won't work¶ ¶ Unfortunately, nobody has proposed a realistic and practical plan to eliminate coal use worldwide or anywhere close to that. There is no White House URL with such a plan. No environmental group has a workable plan either.¶ ¶ Hoping that everyone will abandon their coal plants and replace them with a renewable power mix isn't a viable strategy -- we've proven that in the U.S. Heck, even if the Waxman-Markey bill passes Congress (a big "if"), it is so weak that it won't do much at all to eliminate coal plants. So even though we have Democrats controlling all three branches of government, it is almost impossible to get even a weak climate bill passed.¶ ¶ If we can't pass strong climate legislation in the U.S. with all the stars aligned, how can we expect anyone else to do it? So expecting all countries to pass a 100% renewable portfolio standard (which is far far beyond that contemplated in the current energy bill) just isn't possible. Secondly, even if you could mandate it politically in every country, from a practical standpoint, you'd never be able to implement it in time. And there are lots of experts in this country, including Secretary Chu, who say it's impossible without nuclear (a point which I am strongly in agreement with).¶ ¶ Hoping that everyone will spontaneously adopt carbon capture and sequestration (CCS) is also a non-starter solution. First of all, CCS doesn't exist at commercial scale. Secondly, even if we could make it work at scale, and even it could be magically retrofitted on every coal plant (which we don't know how to do), it would require all countries to agree to add about 30% in extra cost for no perceivable benefit. At the recent G8 conference, India and China have made it clear yet again that they aren't going to agree to emission goals.¶ ¶ Saying that we'll invent some magical new technology that will rescue us at the last minute is a bad solution. That's at best a poor contingency plan.¶ ¶ The point is this: It should be apparent to us that we aren't going to be able to solve the climate crisis by either "force" (economic coercion or legislation) or by international agreement. And relying on technologies like CCS that may never work is a really bad idea.¶ ¶ The only remaining way to solve the crisis is to make it economically irresistible for countries to "do the right thing." The best way to do that is to give the world a way to generate electric power that is economically more attractive than coal with the same benefits as coal (compact power plants, 24x7 generation, can be sited almost anywhere, etc). Even better is if the new technology can simply replace the existing burner in a coal plant. That way, they'll want to switch. No coercion is required.

IFRs solve massive energy and overpopulation crunches that spark resource wars and water scarcity – no alternatives can solve

Blees et al 11 (Tom Blees1, Yoon Chang2, Robert Serafin3, Jerry Peterson4, Joe Shuster1, Charles Archambeau5, Randolph Ware3, 6, Tom Wigley3,7, Barry W. Brook7, 1Science Council for Global Initiatives, 2Argonne National Laboratory, 3National Center for Atmospheric Research, 4University of Colorado, 5Technology Research Associates, 6Cooperative Institute for Research in the Environmental Sciences, 7(climate professor) University of Adelaide, "Advanced nuclear power systems to mitigate climate change (Part III)," 2/24/11) http://bravenewclimate.com/2011/02/24/advanced-nuclear-power-systems-to-mitigate-climate-change/-http://bravenewclimate.com/2011/02/24/advanced-nuclear-power-systems-to-mitigate-climate-change/

The global threat of anthropogenic climate change has become a political hot potato, especially in the USA. The vast majority of climate scientists, however, are in agreement that the potential consequences of inaction are dire indeed. Yet even those who dismiss concerns about climate change cannot discount an array of global challenges facing humanity that absolutely must be solved if wars, dislocations, and social chaos are to be avoided.¶ Human population growth exacerbates a wide range of problems, and with most demographic projections predicting an increase of about 50% to nine or ten billion by mid-century, we are confronted with a social and logistical dilemma of staggering proportions. The most basic human morality dictates that we attempt to solve these problems without resorting to forcible and draconian methods. At the same time, simple social justice demands that the developed world accept the premise that the billions who live today in poverty deserve a drastic improvement in their standard of living, an improvement that is being increasingly demanded and expected throughout the developing countries. To achieve environmental sustainability whilst supporting human well-being will require a global revolution in energy and materials technology and deployment fully as transformative as the Industrial Revolution, but unlike that gradual process we find ourselves under the gun, especially if one considers climate change, peak oil and other immediate sustainability problems to be bona fide threats.¶ It is beyond the purview of this paper to address the question of materials disposition and recycling [i], or the social transformations that will necessarily be involved in confronting the challenges of the next several decades. But the question of energy supply is inextricably bound up with the global solution to our coming crises. It may be argued that energy is the most crucial aspect of any proposed remedy. Our purpose here is to demonstrate that the provision of all the energy that humankind can possibly require to meet the challenges of the coming decades and centuries is a challenge that already has a realistic solution, using technology that is just waiting to be deployed.¶ Energy Realism¶ The purpose of this paper is not to exhaustively examine the many varieties of energy systems currently in use, in development, or in the dreams of their promoters. Nevertheless, because of the apparent passion of both the public and policymakers toward certain energy systems and the political influence of their advocates, a brief discussion of “renewable” energy systems is in order. Our pressing challenges make the prospect of heading down potential energy cul de sacs – especially to the explicit exclusion of nuclear fission alternatives – to be an unconscionable waste of our limited time and resources.¶ There is a vocal contingent of self-styled environmentalists who maintain that wind and solar power—along with other technologies such as wave and tidal power that have yet to be meaningfully developed—can (and should) provide all the energy that humanity demands. The more prominent names are well-known among those who deal with these issues: Amory Lovins, Lester Brown and Arjun Makhijani are three in particular whose organizations wield considerable clout with policymakers. The most recent egregious example to make a public splash, however, was a claim trumpeted with a cover story in Scientific American that all of our energy needs can be met by renewables (predominantly ‘technosolar’ – wind and solar thermal) by 2030. The authors of this piece—Mark Jacobson (Professor, Stanford) and Mark A. Delucchi (researcher, UC Davis)—were roundly critiqued [ii] online and in print.¶ An excellent treatment of the question of renewables’ alleged capacity to provide sufficient energy is a book by David MacKay [iii] called Sustainable Energy – Without the Hot Air. [iv] MacKay was a professor of physics at Cambridge before being appointed Chief Scientific Advisor to the Department of Energy and Climate Change in the UK. His book is a model of scientific and intellectual rigor.¶ Energy ideologies can be every bit as fervent as those of religion, so after suggesting Dr. MacKay’s book as an excellent starting point for a rational discussion of energy systems we’ll leave this necessary digression with a point to ponder. Whatever one believes about the causes of climate change, there is no denying that glaciers around the world are receding at an alarming rate. Billions of people depend on such glaciers for their water supplies. We have already seen cases of civil strife and even warfare caused or exacerbated by competition over water supplies. Yet these are trifling spats when one considers that the approaching demographic avalanche will require us to supply about three billion more people with all the water they need within just four decades.¶ There is no avoiding the fact that the water for all these people—and even more, if the glaciers continue to recede, as expected—will have to come from the ocean. That means a deployment of desalination facilities on an almost unimaginable scale. Not only will it take staggering amounts of energy just to desalinate such a quantity, but moving the water to where it is needed will be an additional energy burden of prodigious proportions. A graphic example can be seen in the case of California, its state water project being the largest single user of energy in California. It consumes an average of 5 billion kWh/yr, more than 25% of the total electricity consumption of the entire state of New Mexico [v].¶ Disposing of the salt derived from such gargantuan desalination enterprises will likewise take a vast amount of energy. Even the relatively modest desalination projects along the shores of the Persian Gulf have increased its salinity to the point of serious concern. Such circumscribed bodies of water simply won’t be available as dumping grounds for the mountains of salt that will be generated, and disposing of it elsewhere will require even more energy to move and disperse it. Given the formidable energy requirements for these water demands alone, any illusions about wind turbines and solar panels being able to supply all the energy humanity requires should be put to rest.¶ Energy Density and Reliability¶ Two of the most important qualities of fossil fuels that enabled their rise to prominence in an industrializing world is their energy density and ease of storage. High energy density and a stable and convenient long-term fuel store are qualities that makes it practical and economical to collect, distribute, and then use them on demand for the myriad of uses to which we put them. This energy density, and the dispatchability that comes from having a non-intermittent fuel source, are the very things lacking in wind and solar and other renewable energy systems, yet they are crucial factors in considering how we can provide reliable on-demand power for human society.¶ The supply of fossil fuels is limited, although the actual limits of each different type are a matter of debate and sometimes change substantially with new technological developments, as we’ve seen recently with the adoption of hydraulic fracturing (fracking) methods to extract natural gas from previously untapped subterranean reservoirs. The competition for fossil fuel resources, whatever their limitations, has been one of the primary causes of wars in the past few decades and can be expected to engender further conflicts and other symptoms of international competition as countries like India and China lead the developing nations in seeking a rising standard of living for their citizens. Even disregarding the climatological imperative to abandon fossil fuels, the economic, social, and geopolitical upheavals attendant upon a continuing reliance on such energy sources demands an objective look at the only other energy-dense and proven resource available to us: nuclear power.¶ We will refrain from discussing the much hoped-for chimera of nuclear fusion as the magic solution to all our energy needs, since it is but one of many technologies that have yet to be harnessed. Our concern here is with technologies that we know will work, so when it comes to harnessing the power of the atom we are confined to nuclear fission. The splitting of uranium and transuranic elements in fission-powered nuclear reactors is a potent example of energy density being tapped for human uses. Reactor-grade uranium (i.e. uranium enriched to about 3.5% U-235) is over 100,000 times more energy-dense than anthracite coal, the purest form of coal used in power generation, and nearly a quarter-million times as much as lignite, the dirty coal used in many power plants around the world. Ironically, one of the world’s largest producers and users of lignite is Germany, the same country whose anti-nuclear political pressure under the banner of environmentalism is globally infamous.¶ The vast majority of the world’s 440 commercial nuclear power plants are light-water reactors (LWRs) that use so-called enriched uranium (mentioned above). Natural uranium is comprised primarily of two isotopes: U-235 and U-238. The former comprises only 0.7% of natural uranium, with U-238 accounting for the remaining 99.3%. LWR technology requires a concentration of at least 3.5% U-235 in order to maintain the chain reaction used to extract energy, so a process called uranium enrichment extracts as much of the U-235 as possible from several kilos of natural uranium and adds it to a fuel kilo in order to reach a concentration high enough to enable the fission process. Because current enrichment technology is capable of harvesting only some of the U-235, this results in about 8-10 kilos of “depleted uranium” (DU) for every kilo of power plant fuel (some of which is enriched to 4% or more, depending on plant design). The USA currently has (largely unwanted) stockpiles of DU in excess of half a million tons, while other countries around the world that have been employing nuclear power over the last half-century have their own DU inventories.¶ Technological advances in LWR engineering have resulted in new power plants that are designated within the industry as Generation III or III+ designs, to differentiate them from currently-used LWRs normally referred to as Gen II plants. The European Pressurized Reactor (EPR), currently being built by AREVA in Finland, France and China, is an example of a Gen III design. It utilizes multiple-redundant engineered systems to assure safety and dependability. Two examples of Gen III+ designs are the Westinghouse/Toshiba AP-1000, now being built in China, and GE/Hitachi’s Economic Simplified Boiling Water Reactor (ESBWR), expected to be certified for commercial use by the U.S. Nuclear Regulatory Commission by the end of 2011. The distinguishing feature of Gen III+ designs is their reliance on the principle of passive safety, which would allow the reactor to automatically shut down in the event of an emergency without operator action or electronic feedback, due to inherent design properties. Relying as they do on the laws of physics rather than active intervention to intercede, they consequently can avoid the necessity for several layers of redundant systems while still maintaining ‘defense in depth’, making it possible to build them both faster and cheaper than Gen III designs—at least in theory. As of this writing we are seeing this playing out in Finland and China. While it is expected that first-of-a-kind difficulties (and their attendant costs) will be worked out so that future plants will be cheaper and faster to build, the experience to date seems to validate the Gen III+ concept. Within a few years both the EPR and the first AP-1000s should be coming online, as well as Korean, Russian and Indian designs, at which point actual experience will begin to tell the tale as subsequent plants are built.¶ The safety and economics of Gen III+ plants seem to be attractive enough to consider this generation of nuclear power to provide reasons for optimism that humanity can manage to provide the energy needed for the future. But naysayers are warning (with highly questionable veracity) about uranium shortages if too many such plants are built. Even if they’re right, the issue can be considered moot, for there is another player waiting in the wings that is so superior to even Gen III+ technology as to render all concerns about nuclear fuel shortages baseless.¶ The Silver Bullet¶ In the endless debate on energy policy and technology that seems to increase by the day, the phrase heard repeatedly is “There is no silver bullet.” (This is sometimes rendered “There is no magic bullet”, presumably by those too young to remember the Lone Ranger TV series.) Yet a fission technology known as the integral fast reactor (IFR), developed at Argonne National Laboratory in the 80s and 90s, gives the lie to that claim.¶ Below is a graph [vi] representing the number of years that each of several power sources would be able to supply all the world’s expected needs if they were to be relied upon as the sole source of humanity’s energy supply. The categories are described thusly:¶ Conventional oil: ordinary oil drilling and extraction as practiced today¶ Conventional gas: likewise¶ Unconventional oil (excluding low-grade oil shale). More expensive methods of recovering oil from more problematic types of deposits¶ Unconventional gas (excluding clathrates and geopressured gas): As with unconventional oil, this encompasses more costly extraction techniques¶ Coal: extracted with techniques in use today. The worldwide coal estimates, however, are open to question and may, in fact, be considerably less than they are ordinarily presented to be, unless unconventional methods like underground in situ gasification are deployed. [vii]¶ Methane Clathrates & Geopressured Gas: These are methane resources that are both problematic and expensive to recover, with the extraction technology for clathrates only in the experimental stage.¶ Low-grade oil shale and sands: Very expensive to extract and horrendously destructive of the environment. So energy-intensive that there have been proposals to site nuclear power plants in the oil shale and tar sands areas to provide the energy for extraction!¶ Uranium in fast breeder reactors (IFRs being the type under discussion here) Integral fast reactors can clearly be seen as the silver bullet that supposedly doesn’t exist. The fact is that IFRs can provide all the energy that humanity requires, and can deliver it cleanly, safely, and economically. This technology is a true game changer.

Resource scarcity causes global wars – highly probable

Klare 2006 – professor of peace and world security studies at Hampshire College

(Michael, Mar 6 2006, “The coming resource wars” http://www.energybulletin.net/node/13605)

It's official: the era of resource wars is upon us. In a major London address, British Defense Secretary John Reid warned that global climate change and dwindling natural resources are combining to increase the likelihood of violent conflict over land, water and energy. Climate change, he indicated, “will make scarce resources, clean water, viable agricultural land even scarcer”—and this will “make the emergence of violent conflict more rather than less likely.” Although not unprecedented, Reid’s prediction of an upsurge in resource conflict is significant both because of his senior rank and the vehemence of his remarks. “The blunt truth is that the lack of water and agricultural land is a significant contributory factor to the tragic conflict we see unfolding in Darfur,” he declared. “We should see this as a warning sign.” Resource conflicts of this type are most likely to arise in the developing world, Reid indicated, but the more advanced and affluent countries are not likely to be spared the damaging and destabilizing effects of global climate change. With sea levels rising, water and energy becoming increasingly scarce and prime agricultural lands turning into deserts, internecine warfare over access to vital resources will become a global phenomenon. Reid’s speech, delivered at the prestigious Chatham House in London (Britain’s equivalent of the Council on Foreign Relations), is but the most recent expression of a growing trend in strategic circles to view environmental and resource effects—rather than political orientation and ideology—as the most potent source of armed conflict in the decades to come. With the world population rising, global consumption rates soaring, energy supplies rapidly disappearing and climate change eradicating valuable farmland, the stage is being set for persistent and worldwide struggles over vital resources. Religious and political strife will not disappear in this scenario, but rather will be channeled into contests over valuable sources of water, food and energy.

Water scarcity causes extinction

Coddrington 10 (7/1, http://www.tomorrowtoday.co.za/2010/07/01/a-looming-crisis-world-water-wars/

PhD-Business Adminstration & Guest lecturer at top business schools, including the London Business School, Duke Corporate Education and the Gordon Institute of Business Science.)

People go to war when their way of life is threatened. I have written before about the many issues we face in the coming years that threaten our way of life. These include global warming/climate change, pollution, pandemics, nuclear bombs, intelligent machines, genetics, and more. More and more I am becoming convinced that the next major regional/global conflict will be over water. We are much more likely to have water wars in the next decade than nuclear ones. And I were to guess, I’d say that it is most likely to happen in around North East Africa. This is a region with its own internal issues. But it also has the foreign involvement of America, China, the Middle Eastern Arab nations, and (increasingly) Israel. Quite a potent mix… Last week, Addis Ababa, Ethiopia hosted the 18th regular meeting of the Council of Ministers of Water Affairs of the Nile Basin countries. In the lead up to the conference, Ethiopia, Rwanda, Uganda, Tanzania and Kenya, the five countries that are all upstream of Egypt and Sudan concluded a water-sharing treaty – to the exclusion of Egypt and Sudan. This has obviously reignited the longstanding dispute over water distribution of the world’s longest river in the world’s driest continent. Egypt is currently the largest consumer of Nile water and is the main beneficiary of a 1929 treaty which allows it to take 55.5 billion cubic metres of water each year, or 87% of the White and Blue Nile’s flow. By contrast, Sudan is only allowed to draw 18.5 billion cubic metres. On attaining independence Sudan refused to acknowledge the validity of the Nile water treaty and negotiated a new bilateral treaty with Egypt in 1959. Kenya, Tanzania and Uganda also expressly refused to be bound by the treaty when they attained independence, but have not negotiated a new treaty since then. Under the 1929 treaty, Egypt has powers over upstream projects: The Nile Waters Agreement of 1929 states that no country in the Nile basin should undertake any works on the Nile, or its tributaries, without Egypt’s express permission. This gives Egypt a veto over anything, including the building of dams on numerous rivers in Kenya, Burundi, Rwanda, Tanzania, Ethiopia, and by implication Egypt has control over agriculture, industry and infrastructure and basic services such as drinking water and electricity in these countries. This is surely untenable. But if the other countries broke the treaty, would Egypt respond with force? Since the late 1990s, Nile Basin states have been trying unsuccessfully to develop a revised framework agreement for water sharing, dubbed the Nile Basin Initiative (NBI). In May 2009, talks held in Kinshasa broke down because Egypt and Sudan’s historical water quotas were not mentioned in the text of the proposed agreement. Water ministers met again in July 2009 in Alexandria, where Egypt and Sudan reiterated their rejection of any agreement that did not clearly establish their historical share of water. This is an untenable position. Upstream states accuse Egypt and Sudan of attempting to maintain an unfair, colonial-era monopoly on the river. Egyptian officials and analysts, however, defend their position, pointing out that Egypt is much more dependent on the river for its water needs than its upstream neighbours. Egypt claims that Nile water accounts for more than 95% of Egypt’s total water consumption, although they appear to be working hard to reduce both their water usage (they’re stopping growing rice, for example) and their dependence on the Nile.

Solvency

Contention 4: Solvency

Plan is modeled internationally

Blees et al 11 (Tom Blees1, Yoon Chang2, Robert Serafin3, Jerry Peterson4, Joe Shuster1, Charles Archambeau5, Randolph Ware3, 6, Tom Wigley3,7, Barry W. Brook7, 1Science Council for Global Initiatives, 2Argonne National Laboratory, 3National Center for Atmospheric Research, 4University of Colorado, 5Technology Research Associates, 6Cooperative Institute for Research in the Environmental Sciences, 7(climate professor) University of Adelaide, "Advanced nuclear power systems to mitigate climate change (Part III)," 2/24/11) <http://bravenewclimate.com/2011/02/24/advanced-nuclear-power-systems-to-mitigate-climate-change/-http://bravenewclimate.com/2011/02/24/advanced-nuclear-power-systems-to-mitigate-climate-change/>

There are many compelling reasons to pursue the rapid demonstration of a full-scale IFR, as a lead-in to a subsequent global deployment of this technology within a relatively short time frame. Certainly the urgency of climate change can be a potent tool in winning over environmentalists to this idea. Yet political expediency—due to widespread skepticism of anthropogenic causes for climate change—suggests that the arguments for rolling out IFRs can be effectively tailored to their audience. Energy security—especially with favorable economics—is a primary interest of every nation.¶ The impressive safety features of new nuclear power plant designs should encourage a rapid uptick in construction without concern for the spent fuel they will produce, for all of it will quickly be used up once IFRs begin to be deployed. It is certainly manageable until that time. Burying spent fuel in non-retrievable geologic depositories should be avoided, since it represents a valuable clean energy resource that can last for centuries even if used on a grand scale.¶ Many countries are now beginning to pursue fast reactor technology without the cooperation of the United States, laboriously (and expensively) re-learning the lessons of what does and doesn’t work. If this continues, we will see a variety of different fast reactor designs, some of which will be less safe than others. Why are we forcing other nations to reinvent the wheel? Since the USA invested years of effort and billions of dollars to develop what is arguably the world’s safest and most efficient fast reactor system in the IFR, and since several nations have asked us to share this technology with them (Russia, China, South Korea, Japan, India), there is a golden opportunity here to develop a common goal—a standardized design, and a framework for international control of fast reactor technology and the fissile material that fuels them. This opportunity should be a top priority in the coming decade, if we are serious about replacing fossil fuels worldwide with sufficient pace to effectively mitigate climate change and other environmental and geopolitical crises of the 21st century.

IFRs are ready for commercial application – solves tech leadership and coal plants

Kirsh 11 (Steven T. Kirsh, Bachelor of Science and a Master of Science in electrical engineering and computer science from the Massachusetts Institute of Technology, “Why Obama should meet Till,” 9/28/11) http://bravenewclimate.com/2011/09/28/why-obama-should-meet-till/¶ I will tell you the story of an amazing clean power technology that can use nuclear waste for fuel and emit no long-lived nuclear waste; that can supply clean power at low cost for our planet, 24×7, for millions of years without running out of fuel. I will tell you why this technology is our best bet to reduce the impact of global warming on our planet. And finally, I will tell you why nobody is doing anything about it and why this needs to be corrected.¶ If you act on this letter, you will save our country billions of dollars and allow us to become leaders in clean energy. If you delegate it downward, nothing will happen.¶ I have no vested interest in this; I am writing because I care about the future of our planet¶ First, since we met only briefly during the Obama campaign, let me provide a little background about myself. I am a high-tech entrepreneur and philanthropist based in Silicon Valley. I have received numerous awards for my philanthropy. For example, in 2003, I was honored to receive a National Caring Award presented by then Senator Clinton. The largest engineering auditorium at MIT is named in my honor. The first community college LEED platinum building in the nation is also named in my honor.¶ I am also active in Democratic politics. In the 2000 election, for example, I was the single largest political donor in the United States, donating over $10 million dollars to help Al Gore get elected. Unfortunately, we lost that one by one vote (on the Supreme Court).¶ I have no vested interest in nuclear power or anything else that is described below. I write only as someone who cares about our nation, the environment, and our planet. I am trying to do everything I can so my kids have a habitable world to live in. Nothing more.¶ Dr. James Hansen first made me aware of fast reactors in his letter to Obama in 2009¶ As an environmentalist, I have been a fan of Jim Hansen’s work for nearly two decades. Many consider Dr. Hansen to be the world’s leading expert on global warming. For example, Hansen was the first person to make Congress aware of global warming in his Senate testimony in 1988. Hansen is also Al Gore’s science advisor.¶ In 2009, Dr. Hansen wrote a letter to President Obama urging him to do just three things that are critical to stop global warming: 1) phase out coal plants, 2) impose a feebate on carbon emissions with a 100% rebate to consumers and 3) re-start fourth generation nuclear plants, which can use nuclear waste as fuel. Hansen’s letter to Obama is documented here: http://www.guardian.co.uk/environment/2009/jan/02/obama-climate-change-james-hansen¶ Upon reading Hansen’s recommendations, I was fascinated by the last recommendation. The fourth-generation power plants Hansen advocated sounded too good to be true. If what Hansen was saying was true, then why wasn’t our nation jumping on that technology? It made no sense to me.¶ Lack of knowledge, misinformation, and the complexity of nuclear technology have hampered efforts to get a fast reactor built in the US¶ I spent the next two years finding out the answer to that question. The short answer is three-fold: (1) most people know absolutely nothing about the amazing fourth generation nuclear power plant that we safely ran for 30 years in the US and (2) there is a lot of misleading information being spread by seemingly respectable people (some of whom are in the White House) who never worked on a fourth generation reactor that is totally false. It’s not that they are misleading people deliberately; it’s just that they were either listening to the wrong sources or they are jumping to erroneous conclusions. For example, the most popular misconception is that “reprocessing is a proliferation risk.” That statement fails to distinguish between available reprocessing techniques. It is absolutely true for the French method but it is absolutely not true for the technology described in this letter! The third reason is that the technology is complicated. Most people don’t know the difference between oxide fuel and metal fuel. Most people don’t know what a fast reactor is. Most people can’t tell you the difference between PUREX, UREX, and pyroprocessing. So people with an agenda can happily trot out arguments that support their beliefs and it all sounds perfectly credible. They simply leave out the critical details.¶ We don’t need more R&D. We already have a technology in hand to help us solve global warming and safely get rid of our nuclear waste at low cost. But we aren’t doing anything with it. That’s a serious mistake.¶ Today, our nation faces many serious challenges such as:¶ How can we avert global warming?¶ How can we dispose of our existing nuclear waste safely?¶ How can we generate base-load carbon-free power at very low cost?¶ How can we avoid creating any additional long-lived nuclear waste?¶ How can we grow our economy and create jobs?¶ How can we become the world leader in clean energy?¶ How can we do all of the above while at the same time spending billions less than we are now?¶ The good news is that we already have a proven technology that can address all of these problems. It is a technology that has enjoyed over 30 years of bi-partisan Congressional and Presidential support. It is an advanced nuclear technology that was invented in 1951 by the legendary Walter Zinn and then refined and perfected over a 30 year period, from 1964 to 1994 by Dr. Charles Till who led a team of 1,200 people at the Argonne National Laboratory. Till’s reactor was known as the Integral Fast Reactor (IFR) because it both produced power and recycled its own waste back into the reactor. This is the technology that Hansen referenced in his letter to the President.¶ The IFR is a fourth-generation nuclear design that has several unique and valuable characteristics:¶ It can use our existing nuclear waste (from power plants and weapons) as fuel; we have over 1,000 years of power available by just using today’s nuclear waste. Instead of trying to bury that “waste” in Yucca Mountain, we could be using it for fuel in fast reactors.¶ It generates no long-lived nuclear waste.¶ It is safer than today’s light water reactor (LWR) nuclear power plants. Unlike the Fukushima LWR reactors (a second generation nuclear technology invented 50 years ago), the IFR does NOT require electricity to shut down safely. The IFR shuts down passively if a mishap occurs; no operator intervention or active safety systems are required. They ran the Three Mile Island and Chernobyl scenarios on a live reactor and the reactor shut itself down safely, no operator intervention required, just as predicted. In addition, unlike with LWRs, the IFR runs at low pressure which adds to the safety profile.¶ It reduces the risk of nuclear proliferation because: (1) it eliminates the need for enrichment facilities (which can be used for making nuclear bomb material), (2) the nuclear material that is used in the IFR is not suitable for making bombs and (2) because the nuclear material in the reactor and in the reprocessing hot cell is too “hot” to be stolen or used in a weapon.¶ Experts at General Electric (GE) believe that the IFR has the potential to produce power for less than the price of coal. Dr. Loewen can confirm that if you have any doubts.¶ GE already has an IFR design on the table that they would like to build as soon as possible. Dr. Loewen can confirm that as well.¶ The US Nuclear Regulatory Commission, in January 1994, issued a pre-application safety evaluation report in which they found no objections or impediments to licensing the IFR. You can see the NRC report in the 8 minute video.¶ The design is proven. It produced electric power without mishap for 30 years before the project was abruptly cancelled.¶ Dr Charles Till¶ The IFR’s ability to solve the nuclear waste problem should not be underestimated. As respected nuclear experts have pointed out, a practical solution to the nuclear waste problem is required if we are to revive nuclear power in the United States. The Blue Ribbon Commission (BRC) on America’s Nuclear Future basically concluded this: “continue doing the same thing we are doing today and keep doing R&D.” That was predictable because it was a consensus report; everyone had to agree. So nothing happened. And because there was no consensus from the BRC , there is less money for nuclear because there is no solution to the waste problem. It’s a downward death spiral.¶ Please pardon me for a second and allow me to rant about consensus reports. In my 30 year career as an entrepreneur, I’ve raised tens of millions of millions of dollars in investment capital from venture capitalists all over the world. I always ask them how they make investment decisions. They always tell me, “If we had to get all partners to agree on an investment, we’d never make any investments. If you can get two partners to champion your company, that is sufficient to drive an investment decision.” Therefore, if you want to get nothing done, ask for a consensus report. If you want to actually solve problems, you should listen to what the people most knowledgeable about the problem are saying.¶ Dr Yoon I. Chang¶ Had President Obama asked the Commissioners on the Nuclear Regulatory Commission (NRC) who have the most knowledge of fast reactors the same question that he tasked the BRC with, he would have gotten a completely different answer. They would have told President Obama that fast reactors and pyroprocessing are the way to go and we better get started immediately with something that we already know works because there is still a ten year time if we were to start the reactor building process today. Their advice leads to a viable solution that we know will work and it will make the US a leader in clean nuclear power. Following the BRC’s consensus advice will lead to decades of inaction. Totally predictable.¶ If we put a national focus on developing and cost reducing the IFR, we’d have a killer product and lead the world in being a clean energy leader¶ It would be great if we had a long-term strategy and vision for how we become energy independent and solve the global warming problem and help our economy at the same time. The IFR can play a key role in that vision. If we put a national focus on developing and commercializing the IFR technology we invented, we can create jobs, help our trade balance, mitigate global warming, become energy independent, show the world a safe way to get rid of nuclear waste, and become the leaders in clean power technology.¶ Nuclear power is the elephant in the room. Even though we haven’t built a new nuclear plant in 30 years, nuclear still supplies 70% of the clean energy in America today. That feat was largely accomplished in a single ten year period. Renewables have had 3 decades to “catch up” and they aren’t anywhere close. Nuclear’s continued dominance shows that nuclear power is indeed the elephant in the room when it comes to being able to install clean energy quickly and affordably.¶ The bad news is that President Clinton decided that this technology, which would have produced unlimited amounts of base-load carbon-free power for a price as low as anything else available today, was not needed and cancelled the project in 1994.¶ Cancelling the IFR was a big mistake. It’s still the world’s best fast nuclear technology according to an independent study by the Gen IV International Forum.¶ Many top scientists all over the world believe that President Clinton’s decision was a huge mistake. The Senate had voted to continue to fund it. The project had been supported by six US Presidents; Republicans and Democrats. In fact, the project’s biggest proponent was Republican President Richard Nixon who said in 1971, “Our best hope today for meeting the Nation’s growing demand for economical clean energy lies with the fast breeder reactor.”¶ Republican Senator Kempthorne said of the IFR cancellation:¶ Unfortunately, this program was canceled just 2 short years before the proof of concept. I assure my colleagues someday our Nation will regret and reverse this shortsighted decision. But complete or not, the concept and the work done to prove it remain genius and a great contribution to the world.¶ While I am not a big fan of Senator Kempthorne, I couldn’t agree more with what he said in this particular case.¶ The IFR remains the single best advanced nuclear power design ever invented. That fact was made clear when in 2002, over 240 leading nuclear scientists from all over the world (in a Gen IV International Forum sponsored study) independently evaluated all fourth-generation nuclear designs and ranked the IFR the #1 best overall advanced nuclear design.¶ The IFR was cancelled in 1994 without so much as a phone call to anyone who worked on the project. They didn’t call then. They haven’t called since. They simply pulled the plug and told people not to talk about the technology.¶ The US government invested over $5 billion dollars in the IFR. Fast reactor R&D is largest single technology investment DOE has ever made. According to a top DOE nuclear official (Ray Hunter, the former NE2 at DOE), the “IFR became the preferred path because of waste management, safety, and economics.” The reactor produced power for 30 years without incident. Despite that track record, before it was cancelled, nobody from the White House ever met with anyone who worked on the project to discuss whether it should be terminated or not. It was simply unilaterally terminated by the White House for political reasons. Technical experts were never consulted. To this day, no one from the White House has met with Dr. Till to understand the benefits of the project. The technical merits simply did not matter.¶ I urge you to recommend to President Obama that he meet personally with Dr. Charles Till so that the President can hear first hand why it is so critical for the health of our nation and our planet that this project, known as the Integral Fast Reactor (IFR), be restarted. Dr. Till headed the project at Argonne National Laboratory until his retirement in 1997. He is, without a doubt, the world’s leading expert on IFR technology.¶ Want to solve global warming? Easy. Just create a 24×7 clean power source that costs the same as coal. Prominent scientists believe that the IFR can achieve this.¶ Dr. Hansen has pointed out many times that it is imperative to eliminate all coal plants worldwide since otherwise, we will never win the battle against global warming. But we know from experience that treaties and agreements do not work. Here’s a quote from an article (“The Most Important Investment that We Aren’t Making to Mitigate the Climate Crisis”) that I wrote in December 2009 published in the Huffington Post:¶ If you want to get emissions reductions, you must make the alternatives for electric power generation cheaper than coal. It’s that simple. If you don’t do that, you lose.¶ The billions we invest in R&D now in building a clean and cheaper alternative to coal power will pay off in spades later. We have a really great option now — the IFR is on the verge of commercial readiness — and potential competitors such as the Liquid Fluoride Thorium Reactor (LFTR) are in the wings. But the US government isn’t investing in developing any of these breakthrough new base-load power generation technologies. Not a single one.¶ I found it really amazing that global leaders were promising billions, even hundreds of billions in Copenhagen for “fighting climate change” when they weren’t investing one cent in the nuclear technologies that can stop coal and replace it with something cheaper.¶ [ Note: 6 days ago, on September 22, 2011, DOE agreed to give $7.5M to MIT to do R&D on a molten-salt reactor. That’s good, but we should be building the technology we already have proven in 30 years of operational experience before we invest in unproven new technologies. ]¶ Dr. Loewen has personally looked at the costs for the building the IFR in detail and believes the IFR can generate power at a cost comparable to a coal plant. So it’s arguably our best shot at displacing coal plants. This is precisely why Dr. Hansen believes that the IFR should be a top priority if we want to save our planet.¶ It isn’t just nuclear experts that support the IFR¶ US Congressman John Garamendi (D-CA) is also a major IFR supporter. When he was Lt. Governor of California, Congressman Garamendi convened a panel of over a dozen our nation’s top scientists to discuss the IFR technology. As a result of that meeting, Garamendi became convinced that the IFR is critically important and he is currently trying very hard to get a bill passed in the House to restart it. Unfortunately, virtually everyone in Congress seems to have forgotten about this project even though in the 1970’s it was the President’s top energy priority. Nothing has changed since then. No other clean energy technology has been invented that is superior to the IFR for generating low-cost carbon-free base-load electric power.¶ Bill Gates also found exactly the same thing when he looked at how to solve the global warming problem. As he explained in a recent TED talk, renewables will never solve the climate crisis. The only viable technology is fourth-generation nuclear power and the best advanced nuclear technology is the IFR. That is why this is Gate’s only clean energy investment. Gates’ TerraPower Travelling Wave Reactor (TWR) is a variant of the IFR design. When Gates approached DOE to try to build his reactor in the US, he was told to build it outside of the US.¶ Nobel prize winner Hans Bethe (now deceased) was an enthusiastic supporter. Freeman Dyson called Bethe the “supreme problem solver of the 20th century. Chuck Till told me the following story of Bethe’s support for the IFR:¶ A tale from the past: A year or two before the events I’ll describe, Hans Bethe had been contacted by the Argonne Lab Director for his recommendation on who to seek to replace the existing head of Argonne’s reactor program.¶ Bethe told him the best choice was already there in the Lab, so it was in this way that I was put in charge. I had had quite a few sessions with him in the years leading up to it, as we were able to do a lot of calculations on the effects of reactor types on resources that he didn’t have the capability at his disposal to do himself.¶ So when I wanted to initiate the IFR thrust, the first outside person I went to was Bethe at Cornell. After a full day of briefing from all the specialists I had taken with me, he suggested a brief private meeting with me. He was direct. He said “All the pieces fit. I am prepared to write a letter stating this. Who do you want me to address it to? I think the President’s Science Advisor, don’t you?” I said the obvious – that his opinion would be given great weight, and would give instant respectability.¶ He went on, “I know him quite well. Who else?” I said I was sure that Senator McClure (who was chairman of Senate Energy and Resources at the time) would be relieved to hear from him. That the Senator would be inclined to support us, as we were fairly prominent in the economy of the state of Idaho, and for that reason I had easy access to him. But to know that Hans Bethe, a man renowned for his common sense in nuclear and all energy matters, supported such an effort would give him the Senator solid and quotable reason for his own support, not dismissible as parochial politics, that the Senator would want if he was to lead the congressional efforts. “Yes,” he said in that way he had, “I agree.”¶ I’ve always thought that the President’s Science Advisor’s intervention with DOE, to give us a start, was not the result of our meeting him, but rather it was because of the gravitas Hans Bethe provided with a one page letter.¶ How do we lead the world in clean energy if we put our most powerful clean energy technology on the shelf?!?¶ President Obama has stated that he wants the US to be a leader in clean energy. I do not see how we achieve that if we allow our most advanced clean energy technology to sit on the shelf collecting dust and we tell one of America’s most respected businessmen that he should build his clean energy technology in another country. We have an opportunity here to export energy technology to China instead of importing it. But due to Clinton’s decision, we are allowing the Russians to sell similar fast reactor technology to the Chinese. It should have been us.¶ Re-starting the IFR will allow us to cancel a $10 billion stupid expenditure. The IFR only costs $3B to build. We’d get more, pay less. On pure economics alone, it’s a no brainer.¶ Finally, even if you find none of the arguments above to be compelling, there is one more reason to restart the IFR project: it will save billions of dollars. Today, we are contracting with the French to build a MOX reprocessing plant in Savannah River. The cost of that project is $10 billion dollars. We are doing it to meet our treaty obligations with the Russians. Former top DOE nuclear managers agree this is a huge waste of money because we can build an IFR which can reprocess 10 times at much weapons waste per year for a fraction of that cost.¶ The Russians are laughing at our stupidity. They are going to be disposing of their weapons waste in fast reactors, just like we should be. The Russians are also exporting their fast reactors to the Chinese. Had the US not cancelled our fast reactor program, we would be the world leader in this technology because our technology remains better than any other fourth generation technology in the world.¶ If you delegate this to someone else, nothing will happen. Here’s why.¶ Delegating this letter downward from the White House to someone in DOE to evaluate will result in inaction and no follow up. I know this from past attempts that have been made. It just gets lost and there is no follow up. Every time. The guys at DOE want to do it, but they know that they will get completely stopped by OMB and OSTP. Both Carol Browner and Steven Chu asked former DOE nuclear management what to do about nuclear waste. They were told that using fast reactors and reprocessing was the way to go. But nothing happened. So Chu has given up trying. According to knowledgeable sources, the White House has told DOE in no uncertain terms, “do not build anything nuclear in the US.” It’s not clear who is making these decisions, but many people believe it is being driven by Steven Fetter in OSTP.¶ Dr. Till knows all of this. He knows that unless he personally meets with the President to tell the story of this amazing technology, nothing will happen.¶ I’ve discussed the IFR with Steve Fetter and he has his facts wrong. Fetter is basically a Frank von Hippel disciple: they have written at least 14 papers together! It was von Hippel who was largely responsible for killing the IFR under Clinton.¶ So von Hippel’s misguided thought process is driving White House policy today. That’s a big mistake. Professor von Hippel twists the facts to support his point of view and fails to bring up compelling counter arguments that he knows are true but would not support his position. He’s not being intellectually honest. I’ve experienced this myself, firsthand. For example, von Hippel often writes that fast reactors are unreliable. When I pointed out to him that there are several examples of reliable fast reactors, including the EBR-II which ran for decades without incident, he said, that these were the “exceptions that prove the rule.” I was floored by that. That’s crazy. It only proves that it is complicated to build a fast reactor, but that it can easily be done very reliably if you know what you are doing. There is nothing inherent to the technology that makes it “unreliable.” You just have to figure out the secrets. When von Hippel heard that Congressman Garamendi was supporting the IFR, he demanded a meeting with Garamendi to “set him straight.” But what happened was just the opposite: Garamendi pointed out to von Hippel that von Hippel’s “facts” were wrong. Von Hippel left that meeting with Garamendi with his tail between his legs muttering something about that being the first time he’s ever spoken with anyone in Congress who knew anything about fast nuclear reactors. In short, if you watch a debate between von Hippel and Garamendi (who is not a scientist), Garamendi easily wins on the facts. If you put von Hippel up against someone who knows the technology like Till, Till would crush von Hippel on both the facts and the arguments. But the Clinton White House never invited Till to debate the arguments with von Hippel. They simply trusted what von Hippel told them. Big mistake.¶ There are lots of problems with von Hippel’s arguments. For example, von Hippel ignores reality believing that if the USA doesn’t do something then it will not happen. That’s incredibly naieve and he’s been proven wrong. The USA invented a safe way to reprocess nuclear waste that isn’t a proliferation risk called pyroprocessing. The nuclear material is not suitable for making a bomb at any time in the process. But we never commercialized it because von Hippel convinced Clinton to cancel it. The French commercialized their reprocessing process (PUREX) which separates out pure plutonium and makes it trivial to make bomb material. So because countries need to reprocess, they pick the unsafe technology because they have no alternative. Similarly, because von Hippel had our fast reactor program cancelled, the Russians are the leaders in fast reactor technology. They’ve been using fast reactor technology for over 30 years to generate power commercially. But we know the Russians have a terrible nuclear safety record (e.g., Chernobyl). The fact is that the Chinese are buying fast reactors from the Russians because there is no US alternative. The problem with von Hippel’s arguments are that the genie is out of the bottle. We can either lead the world in showing how we can do this safely, or the world will choose the less safe alternatives. Today, von Hippel’s decisions have made the world less safe. I could go on and on about how bad von Hippel’s advice is, but this letter is already way too long.¶ MIT was wrong in their report about “The Future of the Nuclear Fuel Cycle”¶ The only other seemingly credible argument against building fast reactors now comes from MIT. The report’s recommendation that we have plenty of time to do R&D appears largely to be driven by one person, co-chair Ernie Moniz.¶ Four world-famous experts on nuclear power and/or climate change and one Congressman challenged Moniz to a debate on the MIT campus on his report. Moniz declined.¶ The report has several major problems. Here are a few of them.¶ The MIT report is inconsistent. On the one hand it says, “To enable an expansion of nuclear power, it must overcome critical challenges in cost, waste disposal, and proliferation concerns while maintaining its currently excellent safety and reliability record.” We agree with that! But then it inexplicably says, “… there are many more viable fuel cycle options and that the optimum choice among them faces great uncertainty…. Greater clarity should emerge over the next few decades… A key message from our work is that we can and should preserve our options for fuel cycle choices by …[continuing doing what we are doing today] … and researching technology alternatives appropriate to a range of nuclear energy futures.” So even though we have a solution now that can be deployed so we can enable an expansion of nuclear power as soon as possible, MIT advises that we should spend a few more decades because we might find something better than the IFR. This is just about the dumbest thing I’ve ever heard coming from MIT. If you ask any scientist who knows anything about global warming, they will tell you we are decades late in deploying carbon-free power. Had we aggressively ramped fast nuclear closed-cycle reactors decades ago and promoted them worldwide, we wouldn’t be anywhere close to the disastrous situation we are in today. So we are decades too late in ramping up nuclear power, and Moniz wants us to spend decades doing more R&D to get a solution that might be lower cost than the IFR. That’s insane.¶ The report looks at the market price of uranium, but the market price completely ignores the environmental impacts of uranium mining. Shouldn’t that be taken into account? It’s like the cost of gas is cheap because the market price doesn’t include the hidden costs: the impact on the environment and on our health.¶ Do you really think that people are going to embrace expansion of uranium mining in the US? The MIT report is silent on that. So then we are back to being dependent on other countries for uranium. Wasn’t the whole point to be energy independent? The IFR provides that now. We wouldn’t have to do any uranium mining ever again. After a thousand years, when we’ve used all our existing nuclear waste as fuel, we can extract the additional fuel we need from seawater, making our seas less radioactive. We can do that for millions of years.¶ The MIT report ignores what other countries are doing. Obama wants the US to be a leader in clean energy technology. You do that by building the most advanced nuclear designs and refining them. That’s the way you learn and improve. MIT would have us stuck on old LWR technology for a few decades. Does anyone seriously think that is the way to be the world leader? There is virtually no room for improvement in LWR technology. IFR technology is nearly 100 times more efficient, and it emits no long term nuclear waste. If you are a buyer of nuclear power in China, which nuclear reactor are you going to pick? The one that is 100 times more efficient and generates no waste? Or the one that is 100 times less efficient and generates waste that you better store for a million years? Wow. Now that’s a real tough question, isn’t it. Gotta ponder that one. I’m sure Apple Computer isn’t taking advice from Moniz. If they were, they’d still be building the Apple I. Ernie should get a clue. The reason Apple is a market leader is because they bring the latest technology to market before anyone else, not because they keep producing old stuff and spend decades doing R&D to see if they can come up with something better. Other countries are not hampered by MIT’s report. France and Japan recently entered into an agreement with the US DOE whereby we’re giving them the IFR technology for them to exploit. Even though we are stupid, they aren’t stupid. The Chinese are ordering inferior oxide fueled fast reactors from Russia. If the US were building metal-fueled fast reactors with pyroprocessing, it’s a good bet the Chinese would be buying from us instead of the Russians. But if we take Moniz’s advice to not build the world’s best advanced nuclear technology we already have, then there is no chance of that happening. By the time we get to market with a fast reactor, it will be all over. We’ll arrive to the market decades late. Another great American invention that we blew it on.¶ There will always be new technologies that people will propose. But the IFR is a bird in the hand and we really need a solution now we can depend on. If something comes along later that is better, that’s great. But if it doesn’t, we will have a viable technology. We can’t afford to get this wrong. We have already run out of time. Any new nuclear designs are decades away from deployment.¶ On September 22, 2011, DOE agreed to give MIT $7.5 millions of dollars on starting R&D on a fourth generation molten salt reactor design that have never been proven. While it might work, the very smart scientists at Oak Ridge National Laboratory spent well over a decade on this and were never able to make it work. So DOE is spending millions on an unproven design while spending nothing on the “sure thing” fourth generation reactor that we already know how to build and that ran flawlessly for 30 years. We are all scratching our heads on that one. It makes no sense. But the reason for this is clear: the mandate from the White House that nothing is to built means that DOE can only initiate research, and then cancel the project right before anything would be built. This is an excellent plan for demoralizing scientists and allowing other countries to lead the world in clean energy. Is that really what we want?? If so, then there are much less expensive ways to accomplish that.¶ At a minimum we should be investing in commercializing our “bird in the hand.” That way, if the new molten salt reactor experiments don’t work out, we’ll still have a viable solution to the nuclear waste problem. If we keep cancelling successful projects right before they are done, hoping for the next big thing, we will forever be in R&D mode and get nothing done. That’s where we are today with fourth generation nuclear.¶ I know this is an unusual request, but I also know that if the President is allowed to evaluate the facts first hand, I am absolutely convinced that he will come to the same conclusion as we all have.¶ I urge you to view an 8 minute video narrated by former CBS Morning News anchor Bill Kurtis that explains all of this in a way that anyone can understand. This video can be found at:¶ The video will amaze you.¶ If you would like an independent assessment of what I wrote above from a neutral , trustworthy, and knowledgeable expert, Bill Magwood would be an excellent choice. Magwood was head of nuclear at DOE under Clinton and Bush, and was the longest serving head of nuclear at DOE in US history. He served under both Clinton and Bush administrations. Magwood is familiar with the IFR, but the IFR was cancelled before he was appointed to head civilian nuclear at DOE. So Magwood has no vested interest in the IFR at all. More recently, Magwood was appointed by President Obama to serve on the NRC and is currently serving in that role. Of the current five NRC Commissioners, Magwood is by far, the person most knowledgeable (PMK) about fast reactors.¶ Thank you for your help in bringing this important matter to the President’s attention.¶ Summary¶ Nuclear power is needed. Renewables alone won’t do it.¶ In order to revive nuclear in the US, you must have a viable solution to the nuclear waste problem.¶ The French reprocess their nuclear waste, but their process is expensive, environmentally unfriendly, and has proliferation problems.¶ The USA developed an inexpensive, environmentally friendly, and proliferation resistant method to reprocess our waste (the IFR), but we cancelled it. That decision was a mistake.¶ We should restart the IFR in the US. It will cost $3B to build, but we can cancel the Areva MOX plant and save $10B to pay for it. So we’ll save money, save the planet from an environmental catastrophe, create jobs, get rid of our nuclear waste, and become the world leader in clean energy technology.¶ President Obama should meet personally with Dr. Charles Till, the world’s leading expert on fast reactor technology. Dr. Till will not waste his time meeting with anyone other than the President because he knows that without personal support of the President, nothing will happen. He’s right.¶ Supporters of this technology include Nobel prize winner Hans Bethe (now deceased), Steven Chu, Dr. James Hansen, Dr. Charles Till, Dr. Eric Loewen, Congressman John Garamendi, Bill Gates, and even the President of MIT. Even the board of directors of the historically anti-nuclear Sierra Club has agreed that they will not oppose building an IFR!¶ Opposition is from OSTP and OMB. We don’t know who or why. It’s a mystery to all my sources. Frank von Hippel thinks you cannot make fast reactors cheaply or reliably and maintains that stance even when the facts show that not to be the case. Ernie Moniz at MIT thinks we shouldn’t build anything now, but do more R&D for the next several decades hoping we can find something better.¶ Bill Magwood, an Obama appointee to the NRC, would be a reasonable choice to provide an objective assessment of the IFR. He has no vested interested in the IFR, but having been the longest serving head of DOE civilian nuclear in history, is familiar with the pros and cons of the technology.¶ Should OSTP and OMB be making these key decisions behind closed doors? Is this really reflective of what the President wants? He’s stated publicly he wants the US to be a world leader in clean energy. Is putting our best technology on the shelf, but licensing the French and Japanese to build it (Joint Statement on Trilateral Cooperation in the area of Sodium-cooled Fast Reactors signed on October 4, 2010 by DOE), the best way for the US to achieve the leadership that Obama said he wanted?¶ I am happy to provide you with additional information.

IFRs are technologically ready – we just have to decide to build them

Brook 11 (Barry Brook, Professor of Climate Change University of Adelaide, “Nuclear power and climate change – what now?” 5/28/11) <http://bravenewclimate.com/2011/05/28/np-cc-what-now/>

But detractors will nevertheless complain that reactors like the ESBWR still produce long-lived radioactive waste products that will have to be safely watched over for what is, for all intents and purposes, forever (from a human standpoint). Another objection frequently raised is the risk of nuclear proliferation, the fear that nuclear material will be misdirected from power plants and made into nuclear weapons. Fuel supply is also an issue when the prospect of a burgeoning nuclear renaissance is considered, with demand for uranium expected to skyrocket. And over all this looms the capital cost of building nuclear power plants, which many consider a deal-breaker even if all the other issues could be resolved. Back in the early Eighties a group of talented nuclear physicists and engineers realized that if there was to be any reasonable expectation of widespread public acceptance of nuclear power, all these problems would have to be solved. So they set out to solve them. Under the leadership of Dr. Charles Till at Argonne National Laboratory’s western branch in the state of Idaho, a virtual army of nuclear professionals designed an energy system that many expect will soon power the planet, if only we can muster the political will to deploy it. Their test reactor operated virtually flawlessly for thirty years as they identified and solved one potential obstacle after another, proceeding methodically until they were ready to demonstrate the commercial-scale viability of their revolutionary fuel recycling system that would complete what had been a spectacularly successful project. What they had accomplished during those years was, without exaggeration, probably the most important energy system ever invented, one that promises virtually unlimited safe, clean energy for the entire planet. Unfortunately, an almost unbelievable shortsightedness on the part of politicians in Washington D.C. pulled the plug on the project just as it reached its final stage in 1994, and the promise of the Integral Fast Reactor (IFR) languished virtually unnoticed for the next fifteen years. Figure 1: A simplified version of an IFR reactor. Illustration courtesy of Andrew Arthur The Integral Fast Reactor But the IFR is such a grand invention that it couldn’t stay buried any longer, and people around the world are now clamoring for it to be deployed. The looming threat of climate change has prompted many to take a fresh look at nuclear power. Some have considered the problem of so-called “nuclear waste” (not waste at all, as we shall soon see) an acceptable price to pay in order to curtail greenhouse gas emissions. In the wake of the Japan accident, safety will also be prominent in the debate. The IFR, though, is so impressive in its qualifications that even previously hard-core anti-nuclear activists have touted it as the ultimate answer. And the fact that over 300 reactor-years of experience have been accumulated with fast reactors around the world means that such technology is no pipe dream, but a mature technology ripe for commercial deployment. The term Integral Fast Reactor denotes two distinct parts: A sodium-cooled fast neutron fission reactor and a recycling facility to process the spent fuel. A single recycling facility would be co-located with a cluster of reactors. Figure 1 shows a simplified version of such a reactor. It consists of a stainless steel tub of sodium, a metal that liquifies at about the boiling point of water. Sodium is used both as a completely non-corrosive coolant and, in a separate non-radioactive loop, as the heat transfer agent to transport the heat to a steam generator in a separate structure (thus avoiding any possible sodium-water interaction in the reactor structure). The system is unpressurized, and the pumps are electromagnetic pumps with no moving parts. In the event of a loss of flow, natural convection and the large amount of sodium will be sufficient to dissipate the heat from the fission products in the core, unlike the situation in the Japanese reactors at Fukushima, which required constant cooling even though the reactors had been shut off. The commercial-scale iteration of the IFR’s reactor component is called the PRISM (or its slightly larger successor, the S-PRISM, though for the sake of brevity I’ll hereafter call it simply the PRISM, which stands for Power Reactor Innovative Small Module). It was designed by a consortium of American companies in conjunction with Argonne Lab, and is now being further refined by GE/Hitachi Nuclear. From a safety standpoint it is unparalleled. If the risk assessment studies for the ESBWR mentioned above sound impressive, those of the IFR are even better. In my book Prescription for the Planet, I did a thought experiment based on the risk assessment studies for the PRISM that have already gotten a preliminary nod from the NRC. The likelihood of a core meltdown was so improbable that I figured out how often we could expect one if thousands of PRISMs were providing all the energy (not just electricity) that humanity will require a few decades hence (according to most estimates). Remember, the occurrence of one meltdown would require dividing the total number of reactors into the probability for a single reactor. Even so, the probable core meltdown frequency came to once every 435,000 years! Even if that risk assessment was exaggerated by ten thousand times, it would still mean we could expect a meltdown about once every half-century for all the energy humanity needs. Reactors and Natural Disasters The crisis at Fukushima’s power plant has stoked fears that existing nuclear sites may be incapable of withstanding quakes in excess of their design specifications. Whereas many lightwater reactors are designed to withstand G forces of about 0.3, the PRISM is rated at 1.0. This G rating is different than a Richter scale rating because the Richter scale represents the total energy released in an earthquake, which is dependent on many factors (duration, depth, etc.). When designing a structure or piece of equipment to withstand earthquakes, the degree of ground acceleration is what matters. If one were to stand directly on a geological fault line during the most severe earthquake imaginable, the G forces caused by ground acceleration would almost certainly not exceed 1.0. (The maximum ground motion at the Fukushima complex during the earthquake measuring 9.0 on the Richter scale was 0.56 G) So the PRISM reactor, designed for that level of motion, could safely be built in any seismically active area. Of course it goes without saying that no power plant should be built at a low elevation in a zone that is vulnerable to tsunamis, or for that matter on a flood plain. But with the PRISM, seismic shocks are not an issue. As for proliferation risk, it should be pointed out that the risk of proliferation from any sort of power reactor has been substantially mischaracterized and generally overblown. The reason is that the isotopic composition of the uranium and plutonium in power reactors is lousy for making weapons. Any country that wishes to pursue a weapons program covertly is far better served by using a small research reactor operated in a specific manner to produce high-grade weapons material, and even then it requires a quite complex reprocessing system to separate it. That being said, the IFR system uses a unique metal fuel that can not only be easily and cheaply recycled on-site and then fabricated into new fuel elements, but at no stage of the fuel cycle is any sort of weapons-grade material isolated. All the isotopes of uranium and plutonium are not only left mixed with their various cousins, but there is always at least a bit of highly radioactive fission product elements, making the fuel impossible to handle except by remote systems. Figure 2: The fission products will only be radioactive beyond the level of natural ore for a few hundred years. The buildup of such fission products in the fuel, though, is what eventually necessitates pulling fuel elements out of the reactor for recycling. In the pyroprocessing system—a type of electrorefining common in the metallurgical industry but unique to the IFR among reactor systems—the majority of the fission products are isolated. The rest of the fuel is reincorporated into new fuel elements. The fission products, representing only a small percentage of the fuel, are entombed in borosilicate glass that can’t leach any of them into the environment for thousands of years. Yet the fission products will only be radioactive beyond the level of natural ore for a few hundred years (see Figure 2). Thus the so-called “million year waste problem” is neatly solved. As for the question of uranium supply, that issue is moot once we begin to build IFRs. First we’ll use up all the spent fuel that’s been generated over the years by LWRs, plus all the weapons-grade uranium and plutonium from decommissioned nuclear weapons. It’s all perfect for fuel in IFRs. But then when that’s all gone we can fuel them with depleted uranium. There is already so much of it out of the ground from years of nuclear power use that even if we were to supply all the energy humanity is likely to need from just IFRs alone, we’ve got enough fuel already at hand for nearly a thousand years. As efficient as LWRs are in squeezing a huge amount of energy out of a small amount of fuel, fast reactors like the PRISM are about 150 times more efficient. In fact, all the energy a profligate American would be likely to use in a lifetime could be extracted from a piece of depleted uranium the size of half a ping-pong ball. Finally we come to the clincher: the cost. For some reason it supposedly is going to cost anywhere from two to five times as much to build a nuclear power plant in the USA than exactly the same design being built in the Far East. This comparison applies not just to countries with low labor costs but to Japan too, where labor costs are high and nearly all the materials are imported. It’s an American societal and political problem, not an inherent flaw of nuclear power. Utility companies fear that a group of protesters with signs and lawyers might shut down construction midway through a multi-billion-dollar project, or prevent a built reactor from operating. So they prudently try to build that uncertainty into their cost estimates (with maybe a little padding to boot). A golf ball of uranium would provide more than enough energy for your entire lifetime, including electricity for homes, vehicles and mobile devices, synthetic fuels for vehicles (including tractors to produce your food and jet fuel for your flights). Your legacy? A soda can of fission product was, that would be less radioactive than natural uranium ore in 300 years. The new reactor designs, both the Gen III+ designs mentioned earlier and the PRISM, are designed to be mass-produced in modules, then assembled at the power plant site. The PRISM has the added advantage of operating at atmospheric pressure, so no pressure vessel or high-pressure pumps are needed. The passive safety principles mean that multiple redundancy is unnecessary, allowing such reactors to have far fewer pumps, valves, controls, and other components than their older Gen II predecessors. Based on both industry estimates and actual experience of building these reactors since the Nineties, there is every reason to believe that the price can be kept well below $2,000/kW, though the Chinese plan to produce them for half that price once their mass production supply lines are in place. There is virtually no doubt that with these new nuclear technologies available, the shift to predominantly nuclear power is virtually inevitable in the long term. Over sixty new plants are under construction around the world with many more to come, even if some nations are temporarily deterred by political and social pressures. If we’re serious about solving the climate change problem before it’s too late, we’ll have to get serious about the only zero-emission baseload power source that can easily supply all the energy the world needs. We shouldn’t consider this a Faustian bargain. These new designs—particularly the IFR—are clean, safe, economical, and able to convert waste products that we desperately want to get rid of into abundant energy for the entire planet. Anyone serious about protecting the environment can safely embrace them with enthusiasm.

Loan guarantees solve – conservative arguments about cronyism and risk underestimation ignore 20 years of loan guarantee data to the contrary

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These programs typically run at very low cost to taxpayers. On average, every $1 allocated to loan and guarantee programs generates more than $99 of economic activity from individuals, businesses, nonprofits, and state and local governments, according to our analysis.¶ But in the wake of certain widely publicized credit blunders, most notably this past summer’s bankruptcy announcement from solar company Solyndra LLC, some have called into question Washington’s ability to manage financial risk. Conservative critics contend that the government is incapable of accurately pricing risk, and that political pressure encourages government agencies to routinely underestimate the risk to taxpayers when extending credit.¶ Government underpricing of risk is a convenient theory for free-market ideologues but it runs contrary to the overwhelming evidence.¶ Our review of federal government credit programs back to 1992 shows that on average the government is quite accurate in its risk pricing. In fact, the majority of government credit programs cost less than originally estimated, not more. Specifically, we found that:¶ Based on initial estimates over the past 20 years, the government expected its credit programs to cost taxpayers 79 cents for every $100 loaned or guaranteed. Based on recently updated data, those cost predictions were reasonably accurate but slightly underestimated. The current budgetary impact of these programs is about 94 cents per $100 loaned or guaranteed.¶ There’s little evidence that credit programs are biased toward underpricing risk. In fact, a little more than half of all nonemergency federal credit programs will cost the government less than what they are expected to over the life of the program.¶ The remainder is accounted for by the losses suffered by the Federal Housing Administration on loans made in 2008 during the peak of the housing crisis. Excluding that book of loans, all nonemergency federal credit programs cost slightly less than expected.¶ Conservative critics often portray a world in which government bureaucrats haphazardly issue loans and loan guarantees without considering taxpayer exposure to risk. That’s simply not the case. This issue brief explains how the government prices credit risk in the federal budget, how well those cost estimates have reflected reality over the years, and why the government is in a particularly good position to assume certain types of risk.¶ Budgeting for credit risk¶ Federal government agencies adhere to strict budget and accounting standards to carefully assess the risks and potential losses associated with credit programs. Here’s how it works.¶ Before an agency can issue any loans or loan guarantees, Congress must first authorize and allocate funding for the program. In most cases Congress starts by determining how much money the program will be authorized to guarantee or loan and then appropriates a certain percentage of that amount to cover the program’s expected cost to the government. That cost estimate—assessed by both the agency administering the program and the president’s Office of Management and Budget—takes into account expected repayments, defaults, recoveries, and any interest or fees collected over the life of the loan, adjusted to current dollars.¶ The net cost to the federal government as a percentage of total dollars loaned or guaranteed is known as the subsidy rate. As an example, say Congress approves a $100 million loan guarantee program within the Department of Agriculture. The department models expected market conditions and loan activity and then estimates a subsidy rate, which the Office of Management and Budget independently estimates as a check on the agency’s methodology. Let’s say the estimated subsidy rate is 0.75 percent. That means the government expects to take a net loss of 75 cents for every $100 it guarantees over the life of those loans. To cover expected losses on the $100 million in loan guarantees, the government sets aside $750,000 in a special account at the Treasury Department. This is similar to a loan loss reserve at a private bank.¶ Each subsequent year, the Office of Management and Budget and the agencies recalculate the subsidy rate to reflect actual loan performance, current economic conditions, and anything else administrators may have learned about a program. These revised numbers are reported in the president’s budget each year, which gives us a pretty good idea of each program’s “actual” costs and the government’s ability to assess financial risk.¶ If conservative claims were accurate in saying that the federal government cannot accurately price for risk, then one would expect the initial cost estimates to be significantly lower than the more recent re-estimates. Using the Department of Agriculture example above, if the critics were right, the re-estimated subsidy rate would presumably be much higher than 0.75 percent, and actual outlays would be higher than estimated. Let’s see how the government’s risk estimates actually stack up.¶ Government risk estimates are quite accurate¶ To test this theory, we analyzed credit data published in the president’s 2013 budget. We compared initial and updated cost estimates, also known as subsidy re-estimates, for each book of nonemergency loans and loan guarantees for each federal credit program since 1992, the first year for which comprehensive data are available.¶ We limit our analysis to nonemergency credit programs, omitting programs created in response to the recent financial crisis. This includes programs created through the Troubled Asset Relief Program—the so-called Wall Street rescue package passed by Congress at the height of the housing and financial crises—and the U.S. Department of the Treasury’s purchase of securities issued by the two troubled housing finance giants Fannie Mae and Freddie Mac. Both of these programs are temporary, atypically large, and are accounted for in the federal budget using different standards than all other credit programs.¶ If we had included these “emergency” programs, it would drastically skew the overall results—but skew them in favor of our basic argument. Based on our analysis of data published in the 2013 budget, these programs will cost the government about $130 billion less than initially expected. So their inclusion would make it seem as though the government significantly overestimated the cost of all credit programs over the past 20 years, which is not the case.¶ We also exclude any federal credit program that is not listed in the federal credit supplement of president’s budget, and any program that did not publish a subsidy re-estimate in the 2013 budget. We do this both because complete data are unavailable for these programs and because their costs are not recorded in the federal budget. Notably, this includes insurance programs through the Federal Deposit Insurance Corporation, mortgage guarantees offered by the two housing finance giants Fannie Mae and Freddie Mac (both now under government conservatorship), and guarantees on mortgage-backed securities offered by the government corporation Ginnie Mae.¶ Here’s what we found out about nonemergency federal credit programs. Federal agencies have issued $5.7 trillion worth of these loans or loan guarantees since 1992. Based on our analysis of initial estimates, the government expected these programs to cost taxpayers about 79 cents for every $100 loaned or guaranteed, or a 0.79 percent subsidy rate overall.¶ Of course, no one expects those estimates to be perfect. Many of these loans such as home mortgages or funding for large infrastructure projects take decades to pay back. Government financial analysts are charged with the difficult task of modeling payments, defaults, recoveries, and market conditions for the entire life of the loan, so some error has to be expected.¶ But as it turns out, the initial estimates weren’t very far off. The current budgetary impact of these credit programs is about 94 cents per $100 loaned or guaranteed, or a 0.94 percent subsidy rate, according to our analysis of updated subsidy estimates. To put that in a budgetary context, while issuing nearly $6 trillion in loans and guarantees over the past 20 years, the government initially predicted about $45 billion in total costs to taxpayers, but the actual costs were slightly higher—about $53 billion.¶ That difference—$8 billion over two decades or $400 million per year—might seem high at first. But it amounts to just 0.15 percent of the total dollars loaned or guaranteed by the government and 0.02 percent of all government spending over that period.(see Figure 1)¶ Of course, the federal government’s performance on individual programs varied substantially. Some programs overestimate risks, while others underestimate. But as mentioned above, some conservatives argue that political pressures cause the government to systemically underprice costs to taxpayers when issuing loans or guarantees.¶ The data show this to be untrue. Of the 104 nonemergency credit programs administered since 1992, our analysis shows that most have actually overestimated total subsidy costs. Fifty-six programs overpriced risk over their lifetimes, while 48 programs underpriced risk. (see Figure 2)¶ Our analysis only takes into account lifetime costs for each program, not the federal government’s ability to estimate costs on an individual year’s portfolio of loans. Indeed, critics often point to individual data points such as the Solyndra bankruptcy as evidence of the government’s inability to price financial risk. But what matters most is actually the net budgetary impact over time of these inaccuracies, which is what is measured in Figure 1.¶ Overall these overestimates and underestimates—whether across programs or in individual books of business—tend to roughly balance out in the long run, give or take a reasonable margin of error. As we show in the following section, however, all of these underestimated losses can actually be attributed to a single year of mortgage guarantees made at the height of the housing crisis.

Government support is vital-~--it overcomes financial barriers to nuclear that the market cannot

Yanosek 12 Kassia, entrepreneur-in-residence at Stanford University’s Steyer-Taylor Center for Energy Policy and Finance and a private equity investor in the energy sector as a principal at Quadrant Management and Founder of Tana Energy Capital LLC, " Financing Nuclear Power in the US", Spring, energyclub.stanford.edu/index.php/Journal/Financing\_Nuclear\_Power\_by\_Kassia\_Yanosek

Over the course of the last decade, it appeared that concerns about carbon emissions, aging coal fleets, and a desire for a diversified generation base were reviving the U.S. utility sector interest in building new nuclear plants. Government and companies worked closely on design certification for Generation III reactors, helping to streamline the licensing process. New loan guarantees from the federal government targeted for nuclear projects were created as part of the 2005 Energy Policy Act. Consequently, dozens of projects entered the planning stages. Following more than 30 years in which no new units were built, it looked as if the U.S. nuclear industry was making significant headway. However, it is yet to be seen how many new nuclear projects will actually make it beyond blueprints due to one of the largest barriers to new nuclear construction: financing risk. Large upfront capital costs, a complex regulatory process, uncertain construction timelines, and technology challenges result in a risk/return profile for nuclear projects that is unattractive for the capital markets without supplementary government or ratepayer support. To many investors, nuclear seems too capital-intensive. Nuclear energy has attractive qualities in comparison to other sources of electricity. A primary motivation to pursue the development of nuclear energy in the U.S. has been its low operating fuel costs compared with coal, oil, and gas-fired plants. Over the lifetime of a generating station, fuel makes up 78% of the total costs of a coal-fired plant. For a combined cycle gas-fired plant, the figure is 89%. According to the Nuclear Energy Institute, the costs for nuclear are approximately 14%, and include processing, enrichment, and fuel management/disposal costs. Today’s low natural gas prices have enhanced the prospects of gas-fired power, but utilities still remain cautious about over-investing in new natural gas generation given the historical volatility of prices. Furthermore, nuclear reactors provide baseload power at scale, which means that these plants produce continuous, reliable power to consistently meet demand. In contrast, renewable energies such as wind or solar are only available when the wind blows or the sun shines, and without storage, these are not suitable for large-scale use. Finally, nuclear energy produces no carbon emissions, which is an attractive attribute for utilities that foresee a carbon tax being imposed in the near future. Given nuclear’s benefits, one may wonder why no new nuclear units have been ordered since the 1970s. This hiatus is in great part due to nuclear’s high cost comparative to other alternatives, and its unique set of risks. As a result, financing nuclear has necessitated government involvement, as the cost of nuclear typically exceeds that of the cost of conventional generation technologies such as coal and natural gas fired generation on a levelized cost of energy (LCOE) basis. LCOE represents the present value of the total cost of building and operating a generating plant over its financial life, converted to equal annual payments and amortized over expected annual generation, and is used to compare across different power generation technologies. For both regulated utilities and independent power producers, nuclear is unattractive if the levelized cost exceeds that of other technologies, since state utility commissions direct regulated utilities to build new capacity using the technology with the lowest LCOE. Furthermore, capital costs are inherently high, ranging in the billions or tens of billions of dollars, and are compounded by financing charges during long construction times. Without government support, financing nuclear is currently not possible in the capital markets. Recently, Constellation Energy and NRG separately pulled the plug on new multi-billion dollar plants, citing financing problems. Projects, however, will get done on a one-off basis. Southern Company’s Vogtle Plant in Eastern Georgia is likely to be the sponsor of the first new generation to be constructed, taking advantage of local regulatory and federal support. Two new reactors of next-generation technology are in the permitting stage, which will bring online 2,200 megawatts (MW) of new capacity, and will cost $14 billion. The project will take advantage of tax credits and loan guarantees provided in the 2005 Energy Policy Act.

And, loan guarantees solve nuclear expansion – shows investors the government has skin in the game, and incentivizes quick agency approval

Adams 10—Publisher of Atomic insights Was in the Navy for 33 years Spent time at the Naval Academy Has experience designing and running small nuclear plants (Rod, Concrete Action to Follow Strongly Supportive Words On Building New Nuclear Power Plants, atomicinsights.com/2010/01/concrete-action-to-follow-strongly-supportive-words-on-building-new-nuclear-power-plants.html)

Loan guarantees are important to the nuclear industry because the currently available models are large, capital intensive projects that need a stable regulatory and financial environment. The projects can be financed because they will produce a regular stream of income that can service the debt and still provide a profit, but that is only true if the banks are assured that the government will not step in at an inopportune time to halt progress and slow down the revenue generation part of the project. Bankers do not forget history or losses very easily; they want to make sure that government decisions like those that halted Shoreham, Barnwell’s recycling facility or the Clinch River Breeder Reactor program are not going to be repeated this time around. For the multi-billion dollar projects being proposed, bankers demand the reassurance that comes when the government is officially supportive and has some “skin in the game” that makes frivolous bureaucratic decisions to erect barriers very expensive for the agency that makes that decision. I have reviewed the conditions established for the guarantee programs pretty carefully – at one time, my company ([Adams Atomic Engines, Inc.](http://www.atomicengines.com)) was considering filing an application. The loan conditions are strict and do a good job of protecting government interests. They were not appropriate for a tiny company, but I can see where a large company would have less trouble complying with the rules and conditions. The conditions do allow low or no cost intervention in the case of negligence or safety issues, but they put the government on the hook for delays that come from bad bureaucratic decision making.

## 1ar

### 1ar genealogy

#### They are misappropriating genealogy – “Sequencing” and "Starting point" instrumentalize history as a telos -- causing an endless search for non-existent first and root causes -- instead treat the debate as a quest for contingent analysis rather than a search for historic origin

**New Hydra '7** , a guy named Chuck who needs no quals to correctly summarize Foucault, "Foucault and the Genealogy" <http://thenewhydra.blogspot.com/2007/04/foucault-and-genealogy.html>

Foucault’s philosophy presents itself accessibly in large part because it consists of genealogies. To begin with, genealogies are topical; that is, their investigations peer into common subjects experienced widely. When Foucault writes on medical institutions in The Birth of the Clinic and punishment in Discipline and Punish, many readers will prefer this concrete analysis of familiar structures to a more abstract philosophical analysis of the issues raised. When he writes on sexuality in particular, he addresses an experience nearly universal. He offers an explanation on the genealogy and its usefulness in the essay “Nietzsche, Genealogy History.” Ultimately, the essay provides an essential foundation to understanding Foucault’s power when it describes the nature of conflict and how the genealogy can address this nature. In the first place, the genealogy appears as an alternative to an historical analysis. Foucault’s intention is not to discredit historians and their detailed work. Instead, he wants to show that **historians often burden themselves with a search for origins that do not exist. “Genealogy does not oppose itself to history as the lofty and profound gaze of the philosopher might compare to the molelike perspective of the scholar; on the contrary, it rejects the meta-historical deployment of ideal significations and indefinite teleologies. It opposes itself to the search for ‘origins’”** (140). Why reject the concept of an origin? Foucault’s problem, and Nietzsche’s problem as well, is simply that the origin is commonly understood as being “the site of truth” (143). **Foucault rejects the notion that “the origin makes possible a field of knowledge whose function is to recover it [truth]” (143). The genealogy rejects using history as a search for origin as a means of recovering truth; instead it challenges the very idea of cause and effect in history, thus weakening any connection between the hypothetical origin and events that followed.**

### 1ar perm

#### The Performative framework calls for the perm. Saying its “their performance” that we can’t “have” destroys performative politics

Bernard E. **Harcourt,** Associate Professor, University of Arizona College of Law. Journal of Criminal Law & Criminology, Fall, 19**99**

The paradigm of resistance, for Butler, is the way in which the term of abuse "queer" was reappropriated by gay men and lesbians and given new meaning through a process of resignification. n133

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n130. Butler, supra note 9, at 24.

n131. Id. at 22.

n132. Id. at 23.

n133. Id. at 14 ("The revaluation of terms such as "queer' suggest that speech can be "returned' to its speaker in a different form, that it can be cited against its originary purposes, and perform a reversal of effects. More generally, then, this suggests that the changeable power of such terms marks a kind of discursive performativity that is not a discrete series of speech acts, but a ritual chain of resignifications whose origin and end remain unfixed and unfixable.")

#### The perm performs remembrance of what they said. Performative politics demand that.

Elizabeth **Weed**, Director of Women's Studies, Brown University; Cardozo Law Review, May, 19**94**

When the law appeals to founding texts or conventions, it can blind itself to its and their deconstructibility. Or it can attend to what the deconstructive reading produces: the performative at work, that is, a function that seems to contain within it the full presence of intention in the inauguration of the text, but which can only ever claim that intention through the text's rendering of it. And it is that space of iteration, that displacement from origin, that forecloses the possibility of any text or system being fully self-present or self-contained. n18

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n18. Derrida uses the signature, a mark with a privileged legal status, as a fine example of a gesture of authentification that depends for its very sense on repetition.

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Since, as Cornell says, the "**performativity** of institutive language cannot be fully incorporated by the system once it is established" (PoL p. 164), the system can always be transformed. Indeed, there is technically no other possibility but transformation since even in the closest replication the iterative gesture is always made anew. This does not mean, Cornell insists throughout, that there is no room for precedent. On the contrary, the call to justice (the justice that is deconstruction) is a call to interpretation, and "interpretation is transformation" (PoL p. 115). Moreover, Cornell goes on, "we cannot escape our responsibility implicit in every act of interpretation" (PoL p. 115). Elsewhere she cites Derrida on the question:

The sense of a responsibility without limits, and so necessarily excessive, incalculable, before memory; and so the task of recalling the history, the origin and subsequent direction, thus the limits, of concepts of justice, the law and right (droit), of values, norms, prescriptions that have been imposed and sedimented there, from then on remaining more or less readable or presupposed. As to the legacy we have received under the name of justice, and in more than one language, the task of a historical and interpretive memory is at the heart of deconstruction ....

(PoL p. 149 n19)

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n19. Quoting FoL, supra note 15, at 19.

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To elucidate this responsibility before memory, Cornell turns to another of Derrida's texts in which he writes of a memory projecting itself toward the future:

The memory we are considering here is not essentially oriented toward the past, toward a past present deemed to have really and previously existed. Memory stays with traces, in order to "preserve" them, but traces of a past that has never been present, traces which themselves never occupy the form of presence and always remain, as it were, to come - come from the future, from the to come a-venir. Resurrection, which is always the formal element of "truth," a recurrent difference between a present and its presence, does not resuscitate a past which had been present; it engages the future.

(PoL p. 147 n20) It is this engagement with the future that Derrida sees possible for justice, a justice called for by the responsibility to memory. The justice that Derrida evokes has "no horizon of expectation (regulative or messianic)." n21 Further:

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n20. Citing Jacques Derrida, The Art of Memoires (Jonathan Culler trans.), in Memoires for Paul de Man 45, 58 (Avital Ronell & Eduardo Cadava eds., 1986).

n21. FoL, supra note 15, at 27.

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But for this very reason, it may have avenir, a "to-come," which I rigorously distinguish from the future that can always reproduce the present. Justice remains, is yet, to come, a venir, it has an, it is a-venir, the very dimension of events irreducibly to come. It will always have it, this a-venir, and always has. Perhaps it is for this reason that justice, insofar as it is not only a juridical or political concept, opens up for l'avenir the transformation, the recasting or refounding of law and politics. "Perhaps," one must always say perhaps for justice.

# Round 5 – Aff v Mo State BR

### Incentives 2AC

#### Counter-interpretation – disbursements of public funds for contingent commitments

Webb, 93 – lecturer in the Faculty of Law at the University of Ottawa (Kernaghan, “Thumbs, Fingers, and Pushing on String: Legal Accountability in the Use of Federal Financial Incentives”, 31 Alta. L. Rev. 501 (1993) Hein Online)

In this paper, "financial incentives" are taken to mean disbursements 18 of public funds or contingent commitments to individuals and organizations, intended to encourage, support or induce certain behaviours in accordance with express public policy objectives. They take the form of grants, contributions, repayable contributions, loans, loan guarantees and insurance, subsidies, procurement contracts and tax expenditures.19 Needless to say, the ability of government to achieve desired behaviour may vary with the type of incentive in use: up-front disbursements of funds (such as with contributions and procurement contracts) may put government in a better position to dictate the terms upon which assistance is provided than contingent disbursements such as loan guarantees and insurance. In some cases, the incentive aspects of the funding come from the conditions attached to use of the monies.20 In others, the mere existence of a program providing financial assistance for a particular activity (eg. low interest loans for a nuclear power plant, or a pulp mill) may be taken as government approval of that activity, and in that sense, an incentive to encourage that type of activity has been created.21 Given the wide variety of incentive types, it will not be possible in a paper of this length to provide anything more than a cursory discussion of some of the main incentives used.22 And, needless to say, the comments made herein concerning accountability apply to differing degrees depending upon the type of incentive under consideration.

By limiting the definition of financial incentives to initiatives where *public* *funds are* either disbursed or *contingently committed*, a large number of regulatory programs with incentive *effects* which exist, but in which no money is forthcoming,23 are excluded from direct examination in this paper. Such programs might be referred to as *indirect* incentives. Through elimination of indirect incentives from the scope of discussion, thedefinition of the incentive instrument becomes both more manageable and more particular. Nevertheless, it is possible that much of the approach taken here may be usefully applied to these types of indirect incentives as well.24 Also excluded from discussion here are social assistance programs such as welfare and ad hoc industry bailout initiatives because such programs are not designed primarily to *encourage* behaviours in furtherance of specific public policy objectives. In effect, these programs are assistance, but they are not incentives.

### AT: Co2 Ag

#### Warming kills crops more – ozone, floods, weeds, natural disasters – and ceiling to CO2’s positive effect, especially for C4 plants

**NRC 11**, National Research Council, Committee on Stabilization Targets for Atmospheric Greenhouse Gas Concentrations; National Research Council [“Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia,” April, the National Academies Press]

Even in the most highly mechanized agricultural systems, food production is very dependent on weather. Concern about the potential impacts of climate change on food production, and associated effects on food prices and hunger, have existed since the earliest days of climate change research. Although there is still much to learn, several important findings have emerged from more than three decades of research. It is clear, for example, that higher CO2 levels are beneficial for many crop and forage yields, for two reasons. In species with a C3 photosynthetic pathway, including rice and wheat, higher CO2 directly stimulates photosynthetic rates, although this mechanism does not affect C4 crops like maize. Secondly, higher CO2 allows leaf pores, called stomata, to shrink, which results in reduced water stress for all crops. The net effect on yields for C3 crops has been measured as an average increase of 14% for 580 ppm relative to 370 ppm (Ainsworth et al., 2008). For C4 species such as maize and sorghum, very few experiments have been conducted but the observed effect is much smaller and often statistically insignificant (Leakey, 2009). Rivaling the direct CO2 effects are the impacts of climate changes caused by CO2, in particular changes in air temperature and available soil moisture. Many mechanisms of temperature response have been identified, with the relative importance of different mechanisms varying by location, season, and crop. Among the most critical responses are that crops develop more quickly under warmer temperatures, leading to shorter growing periods and lower yields, and that higher temperatures drive faster evaporation of water from soils and transpiration of water from crops. Exposure to extremely high temperatures (e.g., > 35ºC) can also cause damage in photosynthetic, reproductive, and other cells, and recent evidence suggests that even short exposures to high temperatures can be crucial for final yield (Schlenker and Roberts, 2009; Wassmann et al., 2009).

A wide variety of approaches have been used in an attempt to quantify yield losses for different climate scenarios. Some models represent individual processes in detail, while others rely on statistical models that, in theory, should capture all relevant processes that have influenced historical variations in crop production. Figure 5.1 shows model estimates of the combined effect of warming and CO2 on yields for different levels of global temperature rise. It is noteworthy that although yields respond nonlinearly to temperature on a daily time scale, with extremely hot days or cold nights weighing heavily in final yields, the simulated response to seasonal warming is fairly linear at broad scales (Lobell and Field, 2007; Schlenker and Roberts, 2009). Several major crops and regions reveal consistently negative temperature sensitivities, with between 5-10% yield loss per degree warming estimated both by process-based and statistical approaches. Most of the nonlinearity in Figure 5.1 reflects the fact that CO2 benefits for yield saturate at higher CO2 levels. For C3 crops, the negative effects of warming are often balanced by positive CO2 effects up to 2-3ºC local warming in temperate regions, after which negative warming effects dominate. Because temperate land areas will warm faster than the global average (see Section 4.2), this corresponds to roughly 1.25-2ºC in global average temperature. For C4 crops, even modest amounts of warming are detrimental in major growing regions given the small response to CO2 (see Box 5.1 for discussion of maize in the United States). The expected impacts illustrated in Figure 5.1 are useful as a measure of the likely direction and magnitude of average yield changes, but fall short of a complete risk analysis, which would, for instance, estimate the chance of exceeding critical thresholds. The existing literature identifies several prominent sources of uncertainty, including those related to the magnitude of local warming per degree global temperature increase, the sensitivity of crop yields to temperature, the CO2 levels corresponding to each temperature level (see Section 3.2), and the magnitude of CO2 fertilization.

#### Co2 depletes soil – kills plants and ecosystems

**Korner et al. 7 –** Christian Korner professor of botany at University Basel, Jack Morgan, plant physiologist at USDA and faculty member in the Crops and Soils Department at Colorado State University, and Richard Norby, researcher in the Environmental Sciences Division at the Oak Ridge National Laboratory (“Terrestrial Ecosystems In A Changing World”, Chapter Two: CO2 Fertilization: When, Where, How Much? p. 9-10, Google Books)

It is obvious that these carbon investments also depend on resources other than CO2, in particular mineral nutrients. A common effect of short-term plant exposure to elevated CO2 is a reduced consumption of nutrients, but also water, per unit of biomass produced (Drake et al. 1997) or a constant consumption at greater biomass per unit land area (Niklaus and Körner 2004). In cases where total nutrient uptake is increased under elevated CO2 (Finzi et al. 2002) this will deplete soil resources in the long run. In cases where tissue nutrient concentrations are depleted, this will induce **cascades of negative ecosystem level feedbacks**, which eventually may also cause initial rates of carbon gain to diminish. In many cases, it became questionable whether carbon is a limiting resource at the whole plant or ecosystem level (Körner 2003a). It is worth recalling that all taxa of today’s biosphere grew and reproduced successfully with only 180–190 ppm, half the current CO2 concentration, 18 000 years before present (peak of last glaciation). Based on this reference period, current biota operate already in a double CO2 atmosphere. In addition, the observed reduction of water consumption per unit land area is likely to induce climatic feedbacks (through a drier atmosphere), not yet accounted for in experiments. Furthermore, any CO2 enrichment effect on plants will depend on their developmental stage, with younger plants more responsive than older ones (Loehle 1995). Most of the CO2-enrichment responses for woody species available to date are – for very practical reasons – for young, rapidly expanding life stages, during which carbon is more likely a limiting resource.

#### Reject ev – bias

**Anthony 09 –** a Senior Research Fellow at the Centre for Marine Studies. Ken started his work on coral reef biology at James Cook University in 1995 (Ken, “CO2 non-science journalism is not doing the World a favour” <http://www.climateshifts.org/?p=1043>)

Remember the last time you tried to reason with someone who constantly took your words out of context in an attempt to argue an opposite futile point? If that left you smiling politely while shaking your head, you probably felt like me after reading the article “Coral Reefs and Climate Change: Unproved Assumptions” by the Idso family posted on their website “CO2 Science” at the Center for the Study of Carbon Dioxide and Global Change**. The article is another sad addition to their more than 500 un-reviewed pieces** - all with the obvious agenda of making their readers believe that climate change science is nothing but alarmist propaganda. In their latest anti-science scribble (Vol 12, No 3) the Idso’s attempt to build the case that “it is premature to suggest that widespread reef collapse is a certain consequence of ongoing bleaching” and that “nature is far more resilient [to climate change] than many people give it credit for..” All of their quotes are from a recent paper by a group of young and excellent Australian marine biologists, Maynard, Baird and Pratchett published in Coral Reefs (27:745-749). Contrary to the Idso’s claims, Maynard et al.’s paper does not question that climate change is a threat to coral reefs. The purpose of Maynard et al.’s paper is to provoke debate around some specific assumptions of thermal thresholds and coral reef’s adaptability to climate change and the functional link between reef degradation and fisheries. Rest assured, Maynard et al. will get the debate they have provoked within the scientific community. Critiques and responses are part of the quality control system of the scientific process and add to the foundation on which our knowledge system is built across disciplines from physics and engineering to medicine. However, by running with a few bits of quotes, stitched together in a fabricated “they say” story, the Idso’s are not doing their readers any favours. Instead, the Idso’s demonstrate two points quite clearly: (1) they have very limited understanding of the science, and (2) their agenda is to write journalism that systematically attempts to discredit the best available climate-change science. After reading a number of their smear campaigns, the Center for the Study of Carbon Dioxide and Global Change takes shape of a law firm defending a client’s case (wonder who they could be?) that is up against an overwhelming amount of opposing evidence. Like rookies, they fumble in their exhibits folder, hoping to win the jury over by causing confusion. The danger of their practise is that they generate disinformation about climate change in a time when the public, the media and governments are in urgent need of good information.

### Kritik

#### Democracy checks their K impact

**O’Kane 97 –** Prof Comparative Political Theory, U Keele (Rosemary, “Modernity, the Holocaust and politics,” Economy and Society 26:1, p 58-9, AG)

Modern bureaucracy is not 'intrinsically capable of genocidal action' (Bauman 1989: 106). Centralized state coercion has no natural move to terror. In the explanation of modern genocides it is chosen policies which play the greatest part, whether in effecting bureaucratic secrecy, organizing forced labour, implementing a system of terror, harnessing science and technology or introducing extermination policies, as means and as ends. As Nazi Germany and Stalin's USSR have shown, furthermore, those chosen policies of genocidal government turned away from and not towards modernity. The choosing of policies, however, is not independent of circumstances. An analysis of the history of each case plays an important part in explaining where and how genocidal governments come to power and analysis of political institutions and structures also helps towards an understanding of the factors which act as obstacles to modern genocide. But it is not just political factors which stand in the way of another Holocaust in modern society. Modern societies have not only pluralist democratic political systems but also economic pluralism where workers are free to change jobs and bargain wages and where independent firms, each with their own independent bureaucracies, exist in competition with state-controlled enterprises. In modern societies this economic pluralism both promotes and is served by the open scientific method. By ignoring competition and the capacity for people to move between organizations whether economic, political, scientific or social, Bauman overlooks crucial but also very 'ordinary and common' attributes of truly modern societies. It is these very ordinary and common attributes of modernity which **stand in the way of modern genocides.**

#### No impact

Thompson, 03 [Michael, founder and editor of Logos and teaches political theory at Hunter College, CUNY. His new book, Islam and the West: Critical Perspectives on Modernity has just been released from Rowman and Littlefield Press, “Iraq, Hegemony and the Question of American Empire”, http://www.logosjournal.com/thompson\_iraq.htm]

It is rare that political debates typically confined to the left will burst into the mainstream with any degree of interest, let alone profundity. But this has not been the case with the question of American empire and the recent military campaigns in places such as Iraq and Afghanistan. For many on the left, this was a political question with a cut and dried answer: the American-led military campaign was a clear expression of its imperial policies and motives, the object of which is economic global dominance. But in some ways, such assumptions voiced by much of the American and European left, specifically among its more dogmatic and sectarian strains, mischaracterize and even misunderstand the reality of American global power and the possible contributions of the western political tradition more broadly.

With each passing day the events in Iraq deliberately evoke the question of American empire, and not without good reason. The neoconservative position on this has been to see American policies and its position in the world as that of a hegemon: a nation which seeks to lead the constellation of world nations into the end of history itself where the fusion of "free" markets and liberal democracy is seen to be the institutional panacea for the world's ills and with this the enlargement of capital's dominion. But the deepening morass of the occupation of Iraq belies such intentions. Paul Bremer's statement that "we dominate the scene [in Iraq] and we will continue to impose our will on this country," is a concise statement betraying not America's imperial motives, but, rather, the way that its hegemonic motives have ineluctably been pushed into a logic of imperial control. America has, in other words, become **an empire by default**, not by intention, and the crucial question now is: how are we to respond?

But the charge of America-as-empire is not as obvious as many have assumed even though many superficial elements of its history point to that conclusion. Students of American political history know of the dual policies of American empire from the late 19th and early 20th centuries. "Gunboat Diplomacy" was the imperial policy of backing up all foreign territorial policies with direct military force. From the Philippines to Cuba, Grenada and Haiti, this was an effective policy, copied from the British and their acts in the Opium War, which allowed the United States to extend itself as a colonial power.

#### Prefer util

Cummiskey 90 – Professor of Philosophy, Bates (David, Kantian Consequentialism, Ethics 100.3, p 601-2, p 606, jstor, AG)

We must not obscure the issue by characterizing this type of case as the sacrifice of individuals for some abstract "social entity." It is not a question of some persons having to bear the cost for some elusive "overall social good." Instead, the question is whether some persons must bear the inescapable cost for the sake of other persons. Nozick, for example, argues that "to use a person in this way does not sufficiently respect and take account of the fact that he is a separate person, that his is the only life he has."30 Why, however, is this not equally true of all those that we do not save through our failure to act? By emphasizing solely the one who must bear the cost if we act, one fails to sufficiently respect and take account of the many other separate persons, each with only one life, who will bear the cost of our inaction. In such a situation, what would a conscientious Kantian agent, an agent motivated by the unconditional value of rational beings, choose? We have a duty to promote the conditions necessary for the existence of rational beings, but both choosing to act and choosing not to act will cost the life of a rational being. Since the basis of Kant's principle is "rational nature exists as an end-in-itself' (GMM, p. 429), the reasonable solution to such a dilemma involves promoting, insofar as one can, the conditions necessary for rational beings. If I sacrifice some for the sake of other rational beings, I do not use them arbitrarily and I do not deny the unconditional value of rational beings. **Persons** may **have "dignity**, an unconditional and incomparable value" that transcends any market value (GMM, p. 436), **but**, as rational beings, persons **also** have **a fundamental equality which dictates that some must** sometimes **give way for the sake of others.** The formula of the end-in-itself thus does not support the view that we may never force another to bear some cost in order to benefit others. If one focuses on the equal value of all rational beings, then equal consideration dictates that one sacrifice some to save many. [continues] According to Kant, the objective end of moral action is the existence of rational beings. Respect for rational beings requires that, in deciding what to do, one give appropriate practical consideration to the unconditional value of rational beings and to the conditional value of happiness. Since agent-centered constraints require a non-value-based rationale, the most natural interpretation of the demand that one give equal respect to all rational beings lead to a consequentialist normative theory. We have seen that there is no sound Kantian reason for abandoning this natural consequentialist interpretation. In particular, a consequentialist interpretation does not require sacrifices which a Kantian ought to consider unreasonable, and it does not involve doing evil so that good may come of it. It simply requires an uncompromising commitment to the equal value and equal claims of all rational beings and a recognition that, in the moral consideration of conduct, one's own subjective concerns do not have overriding importance.

#### Realism is true and inevitable – trying to shift away causes great power war

**Mearsheimer 1** [professor of political science at University of Chicago, The Tragedy of Great Power Politics, pg. 361]

The optimists' claim that security competition and war among the great powers has been burned out of the system is wrong. In fact, all of the major states around the globe still care deeply about the balance of power and are destined to compete for power among themselves for the foreseeable future. Consequently, realism will offer the most powerful explanations of international politics over the next century, and this will be true **even if the debates among academic** and policy **elites are dominated by non-realist theories**. In short, the real world remains a realist world. States still fear each other and seek to gain power at each other's expense, because international anarchy-the driving force behind greatpower behavior-did not change with the end of the Cold War, and there are few signs that such change is likely any time soon. States remain the principal actors in world politics and there is still no night watchman standing above them. For sure, the collapse of the Soviet Union caused a major shift in the global distribution of power. But it did not give rise to a change in the anarchic structure of the system, and without that kind of profound change, there is no reason to expect the great powers to behave much differently in the new century than they did in previous centuries.Indeed, considerable evidence from the 1990s indicates that power politics has not disappeared from Europe and Northeast Asia, the regions in which there are two or more great powers, as well as possible great powers such as Germany and Japan. There is no question, however, that the competition for power over the past decade has been low-key. Still, there is potential for intense security competion among the great powers that might lead to a major war. Probably the best evidence of that possibility is the fact that the United States maintains about one hundred thousand troops each in Europe and in Northeast Asia for the explicit purpose of keeping the major states in each region at peace.

#### Anti-nuclear opposition is totalitarian and causes coal use

King ‘9 - Host and Executive Producer of “White House Chronicle” — a news and public affairs program airing on PBS

After 40 Years, Environmentalists Start To See the Nuclear Light, Llewellyn King, November 25, 2009 – 8:47 pm

Although very little happened, Nov. 24 was a red letter day for the nation’s nuclear power industry. No new nuclear reactors were purchased, no breakthrough in treating nuclear waste was announced, and the Obama administration did not declare that it would pay for new reactors.¶ Instead, the source of the industry’s happiness was The Washington Post leading Page One with an article that detailed how the environmental movement, after 40 years of bitter opposition, now concedes that nuclear power will play a role in averting further harm from global warming.¶ Mind you, not every environmental group has come around, but the feared and respected Natural Resources Defense Council has allowed that there is a place for nuclear power in the world’s generating mix and Stephen Tindale, a former anti-nuclear activist with Friends of the Earth in the United Kingdom, has said, yes, we need nuclear.¶ For the nuclear industry which has felt itself vilified, constrained and damaged by the ceaseless and sometimes pathological opposition of the environmental movement, this changing attitude is manna from on high.¶ No matter that the environmentalists, in opposing nuclear since the late 1960s, have critically wounded the U.S. reactor industry and contributed to the construction of scores of coal and gas-fired plants that would not have been built without their opposition to nuclear.¶ In short, the environmental movement contributed in no small way to driving electric utilities to the carbon fuels they now are seeking to curtail.¶ Nuclear was such a target of the environmental movement that it embraced the “anything but nuclear” policy with abandon. Ergo its enthusiasm for all forms of alternative energy and its spreading of the belief —still popular in left-wing circles — that wind and solar power, with a strong dose of conservation, is all that is needed.¶ A third generation of environmental activists, who have been preoccupied with global climate change, have come to understand that a substantial amount of new electric generation is needed. Also some environmentalists are beginning to be concerned about the visual impact of wind turbines, not to mention their lethality to bats and birds.¶ Of all of the deleterious impacts of modern life on the Earth, it is reasonable to ask why the environmentalists went after nuclear power. And why they were opposed to nuclear power even before the 1979 accident at Three Mile Island in Pennsylvania and the catastrophic 1986 Chernobyl reactor failure in Ukraine. Those deserved pause, but the movement had already indicted the entire nuclear enterprise.¶ Having written about nuclear energy since 1969, I have come to believe that the environmental movement seized on nuclear first because it was an available target for legitimate anger that had spawned the movement in the ’60s. The licensing of nuclear power plants gave the protesters of the time one of the only opportunities to affect public policy in energy. They seized it; at first timorously, and then with gusto.¶ The escalation in environmental targets tells the story of how the movement grew in confidence and expertise; and how it added political allies, like Ralph Nader and Rep. Ed Markey, D-Mass.¶ The first target was simply the plants’ cooling water heating up rivers and estuaries. That was followed by wild extrapolations of the consequences of radiation (mutated children). Finally, it settled on the disposition of nuclear waste; that one stuck, and was a lever that turned public opinion easily. Just mention the 240,000-year half-life of plutonium without mentioning how, as an alpha-emitter, it is easily contained.¶ It is not that we do not need an environmental movement. We do. It is just that sometimes it gets things wrong.¶ In the days of the Atomic Energy Commission, the environmental groups complained that it was policeman, judge and jury. Indeed.¶ But environmental groups are guilty of defining environmental virtue and then policing it, even when the result is a grave distortion, as in the nuclear imbroglio. Being both the arbiter of environmental purity and the enforcer has cost the environment 40 years when it comes to reducing greenhouse gases.

#### Continued reliance on coal kills 13,000 people every year and spreads hazardous pollution

Zelman 11 Joanna, The Huffington Post, "Power Plant Air Pollution Kills 13,000 People Per Year, Coal-Fired Are Most Hazardous: ALA Report", 3/15, www.huffingtonpost.com/2011/03/14/power-plant-air-pollution-coal-kills\_n\_833385.html

The American Lung Association (ALA) recently released a new report on the dramatic health hazards surrounding coal-fired power plants.¶ The report, “Toxic Air: The Case For Cleaning Up Coal-Fired Power Plants,” reveals the dangers of air pollution emitted by coal plants.¶ One of the starkest findings in the report claims, “Particle pollution from power plants is estimated to kill approximately 13,000 people a year.”¶ So what's the biggest culprit?¶ “Coal-fired power plants that sell electricity to the grid produce more hazardous air pollution in the U.S. than any other industrial pollution sources.” According to the report details, over 386,000 tons of air pollutants are emitted from over 400 plants in the U.S. per year. Interestingly, while most of the power plants are located in the Midwest and Southeast, the entire nation is threatened by their toxic emissions.¶ An ALA graph shows that while pollutants such as acid gases stay in the local area, metals such as lead and arsenic travel beyond state lines, and fine particulate matter has a global impact. In other words, while for some workers the pollution may be a tradeoff for employment at a plant, other regions don’t reap the same benefits, but still pay for the costs to their health.¶ The report connected specific pollutants with their health effects. According to the ALA, 76% of U.S. acid gas emissions, which are known to irritate breathing passages, come from coal-fired power plants. Out of all industrial sources, these plants are also the biggest emitter of airborne mercury, which can become part of the human food chain through fish and wildlife -- high mercury levels are linked to brain damage, birth defects, and damage to the nervous system. Overall, air pollutants from coal plants can cause heart attacks, strokes, lung cancer, birth defects, and premature death.¶ The American Lung Association isn’t the only group to connect coal plants with death and illness. A recent study released in the Annals of the New York Academy of Sciences found that, due in large part to health problems, coal costs the U.S. $500 billion per year. Specifically, the study found that the health costs of cancer, lung disease, and respiratory illnesses connected to pollutant emissions totaled over $185 billion per year.

#### State focused nuclear power solutions key – solves their impact better

Nordhaus 11, chairman – Breakthrough Instiute, and Shellenberger, president – Breakthrough Insitute, MA cultural anthropology – University of California, Santa Cruz, 2/25/‘11

(Ted and Michael, <http://thebreakthrough.org/archive/the_long_death_of_environmenta>)

Tenth, we are going to have to get over our suspicion of technology, especially nuclear power. There is no credible path to reducing global carbon emissions without an enormous expansion of nuclear power. It is the only low carbon technology we have today with the demonstrated capability to generate large quantities of centrally generated electrtic power. It is the low carbon of technology of choice for much of the rest of the world. Even uber-green nations, like Germany and Sweden, have reversed plans to phase out nuclear power as they have begun to reconcile their energy needs with their climate commitments. Eleventh, we will need to embrace again the role of the state as a direct provider of public goods. The modern environmental movement, borne of the new left rejection of social authority of all sorts, has embraced the notion of state regulation and even creation of private markets while largely rejecting the generative role of the state. In the modern environmental imagination, government promotion of technology - whether nuclear power, the green revolution, synfuels, or ethanol - almost always ends badly. Never mind that virtually the entire history of American industrialization and technological innovation is the story of government investments in the development and commercialization of new technologies. Think of a transformative technology over the last century - computers, the Internet, pharmaceutical drugs, jet turbines, cellular telephones, nuclear power - and what you will find is government investing in those technologies at a scale that private firms simply cannot replicate. Twelveth, big is beautiful. The rising economies of the developing world will continue to develop whether we want them to or not. The solution to the ecological crises wrought by modernity, technology, and progress will be more modernity, technology, and progress. The solutions to the ecological challenges faced by a planet of 6 billion going on 9 billion will not be decentralized energy technologies like solar panels, small scale organic agriculture, and a drawing of unenforceable boundaries around what remains of our ecological inheritance, be it the rainforests of the Amazon or the chemical composition of the atmosphere. Rather, these solutions will be: large central station power technologies that can meet the energy needs of billions of people increasingly living in the dense mega-cities of the global south without emitting carbon dioxide, further intensification of industrial scale agriculture to meet the nutritional needs of a population that is not only growing but eating higher up the food chain, and a whole suite of new agricultural, desalinization and other technologies for gardening planet Earth that might allow us not only to pull back from forests and other threatened ecosystems but also to create new ones. The New Ecological Politics The great ecological challenges that our generation faces demands an ecological politics that is generative, not restrictive. An ecological politics capable of addressing global warming will require us to reexamine virtually every prominent strand of post-war green ideology. From Paul Erlich's warnings of a population bomb to The Club of Rome's "Limits to Growth," contemporary ecological politics have consistently embraced green Malthusianism despite the fact that the Malthusian premise has persistently failed for the better part of three centuries. Indeed, the green revolution was exponentially increasing agricultural yields at the very moment that Erlich was predicting mass starvation and the serial predictions of peak oil and various others resource collapses that have followed have continue to fail. This does not mean that Malthusian outcomes are impossible, but neither are they inevitable. We do have a choice in the matter, but it is not the choice that greens have long imagined. The choice that humanity faces is not whether to constrain our growth, development, and aspirations or die. It is whether we will continue to innovate and accelerate technological progress in order to thrive. Human technology and ingenuity have repeatedly confounded Malthusian predictions yet green ideology continues to cast a suspect eye towards the very technologies that have allowed us to avoid resource and ecological catastrophes. But such solutions will require environmentalists to abandon the "small is beautiful" ethic that has also characterized environmental thought since the 1960's. We, the most secure, affluent, and thoroughly modern human beings to have ever lived upon the planet, must abandon both the dark, zero-sum Malthusian visions and the idealized and nostalgic fantasies for a simpler, more bucolic past in which humans lived in harmony with Nature.

### Electricity Prices DA

#### Electricity prices will increase – natural gas – only nuke solves

**Powers, 11/8/12 -** editor of Powers Energy Investor, devoted the last 15 years to studying and analyzing the energy sector(Bill, Business Insider, “US Shale Gas Won't Last Ten Years: Bill Powers” <http://www.businessinsider.com/us-shale-gas-wont-last-ten-years-bill-powers-2012-11>)

Bill Powers: My thesis is that the importance of shale gas has been grossly overstated; the U.S. has nowhere close to a 100-year supply. This myth has been perpetuated by self-interested industry, media and politicians. Their mantra is that exploiting shale gas resources will promote untold economic growth, new jobs and lead us toward energy independence.

In the book, I take a very hard look at the facts. And I conclude that the U.S. has between a five- to seven-year supply of shale gas, and not 100 years. That is far lower than the rosy estimates put out by the U.S. Energy Information Administration and others. In the real world, many companies are taking write-downs of their reserves.

Importantly, I give examples of how certain people and institutions are promoting the shale gas myth even as they benefit from it economically. This book will change a lot of opinions about how large the shale gas resources really are in the U.S. and around the planet.

TER: How did you obtain your information?

BP: I spent three years doggedly researching this book. Most of the information came from publicly available sources. I used a fair amount of work done by Art Berman, who has written the forward for the book. Art is a leading expert on determining the productivity of shale gas plays. I contacted a lot of other geologists and petroleum engineering professionals and had them review my conclusions about declining production.

Put simply: There is production decline in the Haynesville and Barnett shales. Output is declining in the Woodford Shale in Oklahoma. Some of the older shale plays, such as the Fayetteville Shale, are starting to roll over. As these shale plays reverse direction and the Marcellus Shale slows down its production growth, overall U.S. production will fall. At the same time, Canadian production is falling. And Canada has historically been the main natural gas import source for the U.S. In fact, Canada has already experienced a significant decline in gas production—about 25%, since a peak in 2002—and has dramatically slowed its exports to the United States.

TER: What does this mean for investors?

BP: The decline is a set-up for a gas crisis, a supply crunch that will lead to much higher prices similar to what we saw in the 1970s.

Interestingly, during the lead-up to that crisis, the gas industry mounted a significant advertising campaign trumpeting the theme, "There's plenty of gas!" Now, it is true that there was a huge ramp-up for gas during the post-World War II period that lasted through the late 1960s as demand for gas for the U.S. manufacturing base grew rapidly. But we hit a production peak in the early 1970s during a time of rapidly growing demand. This led to a huge spike in prices that lasted until 1984.

It was very difficult to destroy demand, so the crisis was resolved by building hundreds of coal-fired power plants and dozens of nuclear power plants. But today, gas-fired plants are popular as we try to turn away from coal. This time around, those options are no longer available. Nuclear plants are still an option, but the time and money involved in keeping our aging nuclear power plant fleet operational, let alone building new plants, will be quite significant.

TER: How will the contraction of the natural gas supply affect its price?

BP: We will see a new equilibrium price for gas at much higher levels than the present. I vehemently disagree with industry observers who say that the U.S. is the next big exporter of liquefied natural gas (LNG). I believe that the U.S. will soon be increasing LNG imports, and that U.S. prices will move back to world levels.

We are currently seeing between $13 per thousand cubic feet (Mcf) and $15/Mcf in South America as Brazil and Argentina import LNG. We're seeing $17/Mcf in Japan and similar prices in Korea. The only place that is not increasing its LNG imports right now is Europe, and that is being made up for by increasing demand in Asia.

#### Intermittency and land ensure only nuclear can solve stable electricity

**Loudermilk 11** Micah J. Loudermilk, Research Associate for the Energy & Environmental Security Policy program with the Institute for National Strategic Studies at National Defense University, 5/31/11, Small Nuclear Reactors and US Energy Security: Concepts, Capabilities, and Costs, www.ensec.org/index.php?option=com\_content&view=article&id=314:small-nuclear-reactors-and-us-energy-security-concepts-capabilities-and-costs&catid=116:content0411&Itemid=375

When discussing the energy security contributions offered by small nuclear reactors, it is not enough to simply compare them with existing nuclear technology, but also to examine how they measure up against other electricity generation alternatives—renewable energy technologies and fossil fuels. Coal, natural gas, and oil currently account for 45%, 23% and 1% respectively of US electricity generation sources. Hydroelectric power accounts for 7%, and other renewable power sources for 4%. These ratios are critical to remember because idealistic visions of providing for US energy security are not as useful as realistic ones balancing the role played by fossil fuels, nuclear power, and renewable energy sources. Limitations of renewables Renewable energy technologies have made great strides forward during the last decade. In an increasingly carbon emissions and greenhouse gas (GHG) aware global commons, the appeal of solar, wind, and other alternative energy sources is strong, and many countries are moving to increase their renewable electricity generation. However, despite massive expansion on this front, renewable sources struggle to keep pace with increasing demand, to say nothing of decreasing the amount of energy obtained from other sources. The continual problem with solar and wind power is that, lacking efficient energy storage mechanisms, it is difficult to contribute to baseload power demands. Due to the intermittent nature of their energy production, which often does not line up with peak demand usage, electricity grids can only handle a limited amount of renewable energy sources—a situation which Germany is now encountering. Simply put, nuclear power provides virtually carbon-free baseload power generation, and renewable options are unable to replicate this, especially not on the scale required by expanding global energy demands. Small nuclear reactors, however, like renewable sources, can provide enhanced, distributed, and localized power generation. As the US moves towards embracing smart grid technologies, power production at this level becomes a critical piece of the puzzle. Especially since renewable sources, due to sprawl, are of limited utility near crowded population centers, small reactors may in fact prove instrumental to enabling the smart grid to become a reality.

#### Manufacturing down now and nuclear solves

**Adams ’10** (Rod Adams. Naval War College diploma in National Policy and Strategy (with highest honors) May 2003 - GPA 4.0, Pro-nuclear advocate with small nuclear plant operating and design experience. Former submarine Engineer Officer. Founder, Adams Atomic Engines, Inc. Host and producer, The Atomic Show Podcast, “Nuclear Industry Can Lead a Revival in Skilled Labor and Manufacturing in the United States”, <http://atomicinsights.com/2010/11/nuclear-industry-can-lead-a-revival-in-skilled-labor-and-manufacturing-in-the-united-states.html>, November 15, 2010, LEQ)

The Nuclear Energy Institute, the American Nuclear Society and the North American Young Generation in Nuclear have been investing time and money into focused workforce development programs for several years. The people leading the effort are taking the action to ensure that there are educated and trained people who are ready to meet the challenge of continuing to reliably operate and maintain our existing fleet of 104 nuclear reactors at the same time that we are reestablishing our nuclear plant manufacturing and construction industry. In 1950 manufacturing accounted for more than 30 percent of all U.S. employment. These skilled labor careers provided an unprecedented standard of living for more than two decades following the end of World War II, allowing millions of Americans to purchase homes and autos and pay for their children to go to college. By 2006, manufacturing employment shrunk to a mere 10 percent of U.S. employment and with it the **bulk** of America’s well-paying **skilled labor careers**. **Prognosticators predicted manufacturing’s ultimate demise as a significant driver of the American economy**. But a look at the U.S. nuclear industry tells a different story: a narrative where job growth in the skilled trades is on an upward trend **and the industry can serve as a role model for the revitalization of the U.S. manufacturing sector through the creation of new careers and economic expansion.** In fact, it already has.

#### Electricity prices have skyrocketed – 5 year trends towards renewables proves

Daniel Simmons (director of state affairs at the Institute for Energy Research) May 17, 2012 “The Democrats' Plan to Jack Up Electricity Prices” http://www.usnews.com/opinion/blogs/on-energy/2012/05/17/the-democrats-plan-to-jack-up-electricity-prices

It is difficult to understand why some people want to see electricity prices increase even more. According to the USA TODAY, household electricity bills have "skyrocketed" the past five years adding about $300 to the yearly household electricity costs. With an economy that continues to struggle, you would think that politicians would be feverishly working to lower electricity prices, but instead many are working to further increase prices. The latest example is Democratic Sen. Jeff Bingaman's proposed "Clean Energy Standard." According to a recent study by the Energy Information Administration, the analytical arm of the Department of Energy, Senator Bingaman's plan would increase electricity prices by 18 percent by 2035. Senator Bingaman's proposal would require 24 percent of electricity generation in 2015 to be from "clean" sources, increasing to 84 percent by 2035. But the bill has a truly bizarre definition of what is "clean." For example, hydroelectric and nuclear plants placed in service before 1992 do not get full credit for being "clean," but hydroelectric and nuclear plants placed in service after 1991 are "clean." Only in Washington, D.C. would a hydroelectric plant only be considered "clean" if it placed in service in 1992, but not in 1991. [See a collection of political cartoons on energy policy.] Most people think of "clean energy" as energy that produces low amounts of pollution such as soot or toxic chemicals, but Senator Bingman's proposal does not concern itself with actual dirtiness. Instead, the bill defines "clean" only based on how much carbon dioxide a power plant emits. This is strange because carbon dioxide itself is not dirty—it is an odorless, colorless gas that is not toxic until carbon dioxide concentrations are many times higher than in the atmosphere. This "clean" energy standard is designed to reduce the amount of electricity generation from coal-fired power plants and replace it with higher-cost sources of electricity. This is why the Clean Energy Standard and other renewable energy mandates increase the costs of electricity. [Read the U.S. News debate: Should the Government Invest in Green Energy?] The supposed need for a Clean Energy Standard is even more puzzling when one considers the abundance of affordable energy resources we have at our disposal. In fact, the United States has the world's largest supply of coal—enough coal to satisfy our needs for at least the next 500 years. Instead of working to increase the price of electricity, it's about time policymakers work on reducing energy prices. But sadly, time after time, our policymakers make it harder for America's families to make ends meet by working to increase the price of energy.

#### Your uniqueness card cites low natural gas prices – they are volatile – link inevitable

Jared Cummans (writer for Commodity HQ) October 23, 2012 “Natural Gas as Volatile as Ever” http://commodityhq.com/2012/natural-gas-as-volatile-as-ever/

Over the past few weeks, it has not been uncommon to watch NG move by 3% or more in a single trading session, as yesterday saw losses fall just shy of the 5% mark. Though traders had been hoping for this energy source to begin to show a bit more reliability, natural gas seems to have fallen into a volatile rut along with the rest of the economy. As we enter the winter months, traders will be looking for cooler weather to spike NG demand, especially considering that we are exiting the warmest 12 month stretch in U.S. history. In October alone, NG dipped by 3.5% over a week, then spiked up 7% over the next week, only to fall 5% in the following week, and that up and down trend has continued for the whole month. The commodity may see some added volatility come election week, as it is generally agreed that a Romney victory will have a greater impact on the NG industry than the same result from Obama [see also 25 Ways To Invest In Natural Gas].

#### Warming decimates the global economy - only thing that can overcome resiliency of the financial system

Kaku 11 – B.S. (summa cum laude) from Harvard University – first in his physics class. went to the Berkeley Radiation Laboratory at the University of California, Berkeley and received a Ph.D, held a lectureship at Princeton University, the author of several scholarly, Ph.D. level textbooks and has had more than 70 articles published in physics journals, Professor of Physics — He holds the Henry Semat Chair and Professorship in theoretical physics at the City College of New York, where he has taught for over 25 years. He has also been a visiting professor at the Institute for Advanced Study at Princeton, as well as New York University (Michio, “Physics of the Future” <http://213.55.83.52/ebooks/physics/Physics%20of%20the%20Future.pdf>) Jacome

Scientists have created pictures of what our coastal cities will look like at midcentury and beyond if sea levels continue to rise. Coastal cities may disappear. Large parts of Manhattan may have to be evacuated, with Wall Street underwater. Governments will have to decide which of their great cities and capitals are worth saving and which are beyond hope. Some cities may be saved via a combination of sophisticated dikes and water gates. Other cities may be deemed hopeless and allowed to vanish under the ocean, creating mass migrations of people. Since most of the commercial and population centers of the world are next to the ocean, this could have a disastrous effect on the world economy.

Even if some cities can be salvaged, there is still the danger that large storms can send surges of water into a city, paralyzing its infrastructure. For example, in 1992 a huge storm surge flooded Manhattan, paralyzing the subway system and trains to New Jersey. With transportation flooded, the economy grinds to a halt.

#### The economy is resilient

**Economist,** Economist Intelligence Unit – Global Forecasting Service, 11/16/’**11**

(<http://gfs.eiu.com/Article.aspx?articleType=gef&articleId=668596451&secID=7>)

The US economy, by any standard, remains weak, and consumer and business sentiment are close to 2009 lows. That said, the economy has been surprisingly resilient in the face of so many shocks. US real GDP expanded by a relatively robust 2.5% in the third quarter of 2011, twice the rate of the previous quarter. Consumer spending rose by 2.4%, which is impressive given that real incomes dropped during the quarter (the savings rate fell, which helps to explain the anomaly.) Historically, US consumers have been willing to spend even in difficult times. Before the 2008-09 slump, personal spending rose in every quarter between 1992 and 2007. That resilience is again in evidence: retail sales in September were at a seven-month high, and sales at chain stores have been strong. Business investment has been even more buoyant: it expanded in the third quarter by an impressive 16.3% at an annual rate, and spending by companies in September on conventional capital goods (that is, excluding defence and aircraft) grew by the most since March. This has been made possible, in part, by strong corporate profits. According to data compiled by Bloomberg, earnings for US companies in the S&P 500 rose by 24% year on year in the third quarter. All of this has occurred despite a debilitating fiscal debate in Washington, a sovereign debt downgrade by a major ratings agency and exceptional volatility in capital markets. This reinforces our view that the US economy, although weak, is not in danger of falling into a recession (absent a shock from the euro zone). US growth will, however, continue to be held back by a weak labour market—the unemployment rate has been at or above 9% for 28 of the last 30 months—and by a moribund housing market.

### Science Diplomacy Add-on

#### US federal nuclear leadership is key to science diplomacy

**AAAS ‘8** ((American Association for the Advancement of Science, 10 July 2008, “Energy Expert Calls on United States to Take Leadership in Nuclear Energy Framework”, <http://www.aaas.org/news/releases/2008/0710nuclear_energy.shtml>, [Miller])

**The** next U.S. **president will have a historic opportunity to exercise leadership in** increasing the global investment in **nuclear** technology**, energy expert Victor Reis said** at a AAAS briefing. But the stakes are higher than just finding an alternative to the rising price of oil and coal. Reis, a senior advisor to Secretary of Energy Samuel W. Bodman, said that a well-designed nuclear energy framework could drive global growth by bringing affordable, reliable energy to the developing world, address climate change through clean energy production, and promote international security by securing nuclear materials around the world. **"By increasing the civilian nuclear enterprise, the** next U.S. **president can make use of a historic opportunity to simultaneously attack the biggest interlocking issues that society will face for the next 50 years**," said Reis. Speaking at AAAS headquarters in Washington, D.C., Reis said that around 1.6 billion people, or 25% of the world's population, live without access to electricity and 2.4 billion, or 35%, rely on traditional, carbon-rich biomass like wood for their energy needs because they have no access to modern fuels. Because experts have found a strong correlation between electricity use and almost every statistic for quality of life including life expectancy, literacy, education, and gross domestic product per capita, Reis said, it is imperative that developed nations bring power to the world's neediest citizens. In addition to being an effective technology to meet the future energy needs of the developing world, Reis said that nuclear power generation is better for the environment because it does not release carbon dioxide into the atmosphere. In order to meet a conservative target of maintaining atmospheric carbon dioxide levels below 550 parts per million—a goal echoed in a 2008 report by the Intergovernmental Panel on Climate Change—while still fulfilling the world's energy needs, Reis says that governments must invest heavily in nuclear technology. "A lot of people around the world don't have access to electricity, and you don't want them to burn carbon-rich sources like coal," said Reis, adding that he doesn't see "how you can realistically address climate change without nuclear power." Reis said he is encouraged that many politicians, including those running for president, recognize climate change as among the most pressing issues for their first term in office. Sponsored by the AAAS Center for Science, Technology, and Security Policy, the 2 June briefing on nuclear energy brought together scientists, policy makers, students, and the media. At the event, Benn Tannenbaum, the Center's associate program director, said that he has noticed an increasing amount of opinion and commentary articles on nuclear technology in the nation's largest newspapers, suggesting that it is becoming a heavily discussed issue. "Nuclear energy has tremendous implications for the coming century," said Tannenbaum. "It's absolutely that vital that policy makers make informed decisions with the help of scientists to determine if and how nuclear energy programs move forward. The stakes are incredibly high." Reis said that regardless of U.S. domestic plans to increase nuclear energy production, a widespread global initiative to generate electricity using nuclear power is already underway. Around the world, there are already 439 nuclear reactors in 31 countries, representing 16% of the world's total electricity production. In the United States alone, there are 104 reactors representing 20% of domestic electricity production. Reis added that there are around 93 nuclear power-generating facilities on order or planned globally. He pointed out, however, that there are many challenges to increasing nuclear power around the world, most notably ensuring that radioactive materials used in nuclear power production are not obtained by terrorists or rogue states. One controversial solution announced in 2006 by the administration of U.S. President George W. Bush is the Global Nuclear Energy Partnership (GNEP), an international agreement that has been signed by 21 nations including the United States, the United Kingdom, Russia, China, and France. Under GNEP, the United States and other nations with advanced civilian nuclear energy production facilities would be responsible for safely reprocessing spent nuclear fuel from energy production and then would export it to be reused for other nations' energy programs. This would reduce the number of nuclear enrichment and reprocessing sites around the world, Reis said. He said that the Reliable Replacement Warhead (RRW) program, announced by Bush in 2004, would also help to significantly reduce the overall number of weapons in the U.S. nuclear arsenal while modernizing their design. Weapons experts believe that this may encourage other nations including Russia to reduce their stockpiles. While some experts like former Secretaries of State George P. Shultz and Henry A. Kissinger suggest that nations should aim to achieve a nuclear weapons-free world, others such as former Secretary of Defense Harold Brown and former Director of Central Intelligence John Deutch believe that it is an unreasonable goal and poor policy. Beyond the proliferation of enriched nuclear material, many critics of nuclear power production in the United States fear the increased amount of toxic materials that need to be transported from the reactors to storage after they are used. Reis said he understood those concerns but pointed to the 100 million miles of safe travel that the Department of Energy has overseen for the nation's nuclear weapons and energy materials. He said the same procedures can be applied to commercial nuclear energy. In addition, many nuclear power critics fear the consequences of reactor accidents like the 1986 Chernobyl accident in the Soviet Union and the 1979 Three Mile Island accident near Harrisburg, Pennsylvania. Reis once again pointed out the globe's "remarkable" safety record during more than 12,000 reactor-years of operation with significant improvements made to world's nuclear infrastructure following the incidents. The Three Mile Island incident caused no documented injuries and led to important improvements in U.S. and global safety operations, he said. He added that the Chernobyl disaster involved a reactor that was poorly designed and did not have sufficient containment, which lead to a new generation of reactors with higher safety specifications. Another significant issue with nuclear energy production is where to store the radioactive materials. One controversial proposal is to transport all waste to the Yucca Mountain Repository, a geological storage facility1000 feet deep in the Nevada desert. While the plan has its advantages, such as the ability to retrieve the materials after they are deposited, Reis said that many find the program "geographically unfair" because it makes one region assume the entire burden of the nation's nuclear waste. Regardless of the decision to increase nuclear energy production over the coming decades, Reis said that the Department of Energy (DOE) is able and ready to meet the new challenges of the 21st Century. With over 12,440 Ph.D. scientists, 25,000 visiting scientists, and 17 laboratories across the country, Reis said that **the DOE laboratories "represent one of the biggest scientific collections in the world [and] maybe in the history of civilization."** Beyond access to some of the **top scientific minds and computers** in the world, Reis highlighted several major DOE achievements including **maintaining six top research facilities**, certifying the U.S. nuclear weapons arsenal without underground testing, **helping other nations** secure their nuclear materials, and cleaning up the Rocky Flats weapons production facility and helping convert it into a wildlife refuge. In addition, Reis said that the DOE has nine years of successful operation of its Waste Isolation Pilot Plant (WIPP). Located in Carlsbad, New Mexico, the facility is an underground radioactive waste repository serving as a frontrunner for the Yucca Mountain site. "**Because of the implications of nuclear energy, good or bad, it is important that the** next **administration seize the opportunity for global leadership by using the Department of Energy's world leading assets**," Reis said. Reis added that **the nuclear enterprise could become a vehicle for international cooperation**, echoing a December 1953 speech by U.S. President Dwight D. Eisenhower in which he pledged to devote the nation's "entire heart and mind to find the way by which the miraculous inventiveness of man shall not be dedicated to his death, but consecrated to his life."

#### Science diplomacy accesses every impact

**Fedoroff ‘8** (Nina, Science and Technology Advisor to the Secretary of State, “Making Science Diplomacy more Effective”, Testimony before the House Science Subcommittee on Research and Science Education, 4-2, <http://legislative.nasa.gov/hearings/4-2-08%20Fedoroff.pdf>)

**Science by its nature facilitates diplomacy because it strengthens political relationships, embodies powerful ideals, and creates opportunities** for all. The global scientific community embraces principles Americans cherish: transparency, meritocracy, accountability, the objective evaluation of evidence, and broad and frequently democratic participation. Science is inherently democratic, respecting evidence and truth above all. Science is also a common global language, able to bridge deep political and religious divides. Scientists share a common language. Scientific interactions serve to keep open lines of communication and **cultural understanding**. As scientists everywhere have a common evidentiary external reference system, members of ideologically divergent societies can use the common language of science to cooperatively address both domestic and the increasingly trans-national and global problems confronting humanity in the 21st century. There is a growing recognition that science and technology will increasingly drive the successful economies of the 21st century. Science and technology provide an immeasurable benefit to the U.S. by bringing scientists and students here, especially from developing countries, where they see democracy in action, make friends in the international scientific community, become familiar with American technology, and contribute to the U.S. and global economy. For example, in 2005, over 50% of physical science and engineering graduate students and postdoctoral researchers trained in the U.S. have been foreign nationals. Moreover, many foreign-born scientists who were educated and have worked in the U.S. eventually progress in their careers to hold influential positions in ministries and institutions both in this country and in their home countries. They also contribute to U.S. scientific and technologic development: According to the National Science Board`s 2008 Science and Engineering Indicators, 47% of full-time doctoral science and engineering faculty in U.S. research institutions were foreign-born. Finally, some types of science - particularly those that address the grand challenges in science and technology - are inherently international in scope and collaborative by necessity. The ITER Project, an international fusion research and development collaboration, is a product of the thaw in superpower relations between Soviet President Mikhail Gorbachev and U.S. President Ronald Reagan. This reactor will harness the power of nuclear fusion as a possible new and viable energy source by bringing a star to earth. ITER serves as a symbol of international scientific cooperation among key scientific leaders in the developed and developing world - Japan, Korea, China, E.U., India, Russia, and United States - representing 70% of the world`s current population. The recent elimination of funding for FY08 U.S. contributions to the ITER project comes at an inopportune time as the Agreement on the Establishment of the ITER International Fusion Energy Organization for the Joint Implementation of the ITER Project had entered into force only on October 2007. The elimination of the promised U.S. contribution drew our allies to question our commitment and credibility in international cooperative ventures. More problematically, it jeopardizes a platform for reaffirming U.S. relations with key states. It should be noted that even at the height of the cold war, the United States used science diplomacy as a means to maintain communications and avoid misunderstanding between the world`s two nuclear powers - the Soviet Union and the United States. In a complex multi-polar world, relations are more challenging, the threats perhaps greater, and the need for engagement more paramount. Using Science Diplomacy to Achieve National Security Objectives The welfare and stability of countries and regions in many parts of the globe require[s] a concerted effort by the developed world to address the causal factors that render countries fragile and cause states to fail. Countries that are unable to defend their people against starvation, or fail to provide economic opportunity, are susceptible to extremist ideologies, autocratic rule, and abuses of human rights. As well, the world faces common threats, among them **climate change, energy and water shortages, public health emergencies, environmental degradation, poverty, food insecurity, and religious extremism**. These threats can undermine the national security of the United States, both directly and indirectly. Many are blind to political boundaries, **becoming regional or global threats**. The United States has no monopoly on knowledge in a globalizing world and the scientific challenges **facing humankind** are enormous. Addressing these common challenges demands common solutions and necessitates **scientific cooperation**, common standards, and common goals. We must increasingly harness the power of American ingenuity in science and technology through strong partnerships with the science community in both academia and the private sector, in the U.S. and abroad among our allies, to advance U.S. interests in foreign policy. There are also important challenges to the ability of states to supply their populations with sufficient food. The still-growing human population, rising affluence in emerging economies, and other factors have combined to create unprecedented pressures on global prices of staples such as edible oils and grains. Encouraging and promoting the use of contemporary molecular techniques in crop improvement is an essential goal for US science diplomacy. An essential part of the war on terrorism is a war of ideas. The creation of economic opportunity can do much more to combat the rise of fanaticism than can any weapon. The war of ideas is a war about rationalism as opposed to irrationalism. Science and technology put us firmly on the side of rationalism by providing ideas and opportunities that improve people`s lives. We may use the recognition and the goodwill that science still generates for the United States to achieve our diplomatic and developmental goals. Additionally, the Department continues to use science as a means to reduce the proliferation of the weapons` of mass destruction and prevent what has been dubbed `brain drain`. Through cooperative threat reduction activities, former weapons scientists redirect their skills to participate in peaceful, collaborative international research in a large variety of scientific fields. In addition, new global efforts focus on improving **biological**, chemical, and **nuclear security** by promoting and implementing **best scientific practices as a means to enhance security, increase global partnerships, and create sustainability.**

### Fiscal Cliff

#### No impact to sequestration – rhetoric is overblown and doesn’t decrease overall spending

Derugy, 12 [September 13th,Fears over sequestration are overblown, senior research fellow at the Mercatus Center at George Mason University, <http://washingtonexaminer.com/fears-over-sequestration-are-overblown/article/2507916#.UJsn2oZ1v3U>] Thanks to the Budget Control Act of 2011, the Pentagon is due for a cut of $500 billion over nine years, starting on Jan. 2, 2013. Next year's cut comes in at $54 billion. That prospect has generated a lot of end-of-the-world-type rhetoric from Washington hawks. Yet with the national debt exceeding $16 trillion, a gross debt-to-GDP ratio above 100 percent, and Moody's Investors Service warning the country of a potential credit downgrade, we need to cut through the rhetoric and face the facts. Defense sequester cuts simply do not warrant the fears they inspire. The sequester will certainly pose management challenges in its first year of implementation. Yet even under sequestration, defense spending merely reverts to its level in 2007 -- a year in which America was ably defended and plenty of cash flowed to the armed forces. And that's in real, inflation-adjusted terms. By 2018, the defense budget returns to its fiscal 2012 level. In nominal terms, cumulative nonwar defense spending over the FY2012-FY2021 period will increase to $4.8 trillion with sequestration, as opposed to $5.3 trillion without it. In other words, even with sequestration, nonwar military spending will still grow by about 10 percent over the next decade. According to the Congressional Budget Office, over that period, the Department of Defense will also spend an additional $400 billion on war, on top of its base budget. And if a decade's worth of behavior is any indication of the future, we can predict that Congress will continue to use this war account to provide additional nonwar spending to the military. For instance, according to defense spending expert Russell Rumbaugh, Senate appropriators moved some $10 billion in requested funding from the base budget to the war budget last November, when they marked up the 2012 defense appropriations bill. CQ Weekly's Frank Oliveri reported that the House-passed 2013 appropriations bill shifts an additional $5.9 billion of nonwar spending into the war column as well for ordinary nonwar spending on bases. Defense spending is not just one of the most sacrosanct parts of the budget, but also one of the largest and most inscrutable. Adjusting for inflation, military spending has grown for an unprecedented 14 consecutive years and is now higher than at any time since World War II. Even excluding war costs, the military base budget has grown by about 50 percent over the past decade. And figuring out how much is actually spent on the military is not an easy task. Perhaps more important for those concerned about the United States' defense standing, even after the sequestration cuts, the United States will remain the biggest global military power in the world.

#### No middle east war

**Fettweis 2007** – assistant political science professor at Tulane, assistant professor of National Security Affairs at US Naval War College (December, Christopher, Survival, 49.4, “On the Consequences of Failure in Iraq”)

Without the US presence, a second argument goes, nothing would prevent Sunni-Shia violence from sweeping into every country where the religious divide exists. A Sunni bloc with centres in Riyadh and Cairo might face a Shia bloc headquartered in Tehran, both of which would face enormous pressure from their own people to fight proxy wars across the region. In addition to intra-Muslim civil war, cross-border warfare could not be ruled out. Jordan might be the first to send troops into Iraq to secure its own border; once the dam breaks, Iran, Turkey, Syria and Saudi Arabia might follow suit. The Middle East has no shortage of rivalries, any of which might descend into direct conflict after a destabilising US withdrawal. In the worst case, Iran might emerge as the regional hegemon, able to bully and blackmail its neighbours with its new nuclear arsenal. Saudi Arabia and Egypt would soon demand suitable deterrents of their own, and a nuclear arms race would envelop the region. Once again, however, none of these outcomes is particularly likely.

Wider war

No matter what the outcome in Iraq, the region is not likely to devolve into chaos. Although it might seem counter-intuitive, by most traditional measures the Middle East is very stable. Continuous, uninterrupted governance is the norm, not the exception; most Middle East regimes have been in power for decades. Its monarchies, from Morocco to Jordan to every Gulf state, have generally been in power since these countries gained independence. In Egypt Hosni Mubarak has ruled for almost three decades, and Muammar Gadhafi in Libya for almost four. The region's autocrats have been more likely to die quiet, natural deaths than meet the hangman or post-coup firing squads. Saddam's rather unpredictable regime, which attacked its neighbours twice, was one of the few exceptions to this pattern of stability, and he met an end unusual for the modern Middle East. Its regimes have survived potentially destabilising shocks before, and they would be likely to do so again.

The region actually experiences very little cross-border warfare, and even less since the end of the Cold War. Saddam again provided an exception, as did the Israelis, with their adventures in Lebanon. Israel fought four wars with neighbouring states in the first 25 years of its existence, but none in the 34 years since. Vicious civil wars that once engulfed Lebanon and Algeria have gone quiet, and its ethnic conflicts do not make the region particularly unique.

The biggest risk of an American withdrawal is intensified civil war in Iraq rather than regional conflagration. Iraq's neighbours will likely not prove eager to fight each other to determine who gets to be the next country to spend itself into penury propping up an unpopular puppet regime next door. As much as the Saudis and Iranians may threaten to intervene on behalf of their co-religionists, they have shown no eagerness to replace the counter-insurgency role that American troops play today. If the United States, with its remarkable military and unlimited resources, could not bring about its desired solutions in Iraq, why would any other country think it could do so?17

Common interest, not the presence of the US military, provides the ultimate foundation for stability. All ruling regimes in the Middle East share a common (and understandable) fear of instability. It is the interest of every actor - the Iraqis, their neighbours and the rest of the world - to see a stable, functioning government emerge in Iraq. If the United States were to withdraw, increased regional cooperation to address that common interest is far more likely than outright warfare.

#### Credibility impacts are empirically false and unsupported by any research

**Fettweis, 10** – assistant professor of political science at Tulane University (Christopher, “The Remnants of Honor: Pathology, Credibility and U.S. Foreign Policy," August, http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=1657460)

If credibility kept a state safe in a dangerous world, then the occasional war to bolster it would be a small price to pay. There are good reasons to believe that this is not the case. In order for credibility to be a useful, rational motivation for action, two criteria must be met: There must be actors in society with the desire and capability to take advantage of perceived low credibility; and second, there must be good reason to believe that they can be deterred by a reputation for resolve. For the United States in the twenty-first century, neither of these is fulfilled. The current international system does not resemble the kind of dangerous, anarchic world where honor and credibility can deter aggression. A concern for credibility is irrational when there are no major enemies poised to take advantage of irresolution. Furthermore, decades of research cast doubt upon the deterrent ability of honor in the international system, suggesting that its benefits are illusory. Target states rarely learn the lessons we try to teach them. Credibility never kept a country safe; fortunately, in today’s world, the United States is safe with or without it.

#### Won’t pass – can’t overcome GOP obstructionism

Kelley Beaucar Vlahos (writer for Fox News) November 7, 2012 “

Gridlock as usual or new era of compromise? Washington stares down 'fiscal cliff' crisis after election” http://www.foxnews.com/politics/2012/11/07/gridlock-as-usual-or-new-era-compromise-washington-faces-choice-after-election/

Obama and the Democrats have shown interest in letting the so-called Bush tax rates expire for the top earners, while Republicans have not shown an inclination yet for budging on it. Time will tell if there is room for negotiation -- a combination of increased revenue and cuts -- though Obama may hold the upper hand. Still, the ideological lines are firm and with the addition of two fiscal conservatives to the Republican ranks in the Senate -- Ted Cruz from Texas, and Jeff Flake in Arizona -- there might be more of a hardening than Hill watchers think, said David Boaz, senior politics analyst from the Cato Institute. "My gut level instinct would be there are fundamental differences between the Democrats and the Republicans in Congress and the election hasn't moved us any closer to resolving these questions," he said.

#### Thumpers non-unique or deny the link:

#### Immigration reform

Manu Raji (writer for Politico) November 7, 2012 “Harry Reid agenda: Filibuster crackdown, tax increases” http://www.politico.com/news/stories/1112/83514.html

Once the procedural snafus are resolved, Reid said “very high” on his priority list will be an attempt to pass an immigration overhaul, an issue important to the Latino community that powered Tuesday night’s Democratic wins. But it would certainly start a divisive and emotional debate certain to alienate conservative members of both parties. Reid said he could get 90 percent of his caucus to support such a measure. Republicans, he said, would block immigration reform “at their peril.” “Not for political reasons; because it’s the wrong thing to do to not have comprehensive immigration reform,” Reid said. “The system’s broken and needs to be fixed.”

#### Sportman act

Chad Pergram (writer for Fox News) October 27, 2012 “The Hitchhiker's Guide to the Lame Duck Session of Congress” http://politics.blogs.foxnews.com/2012/10/27/hitchhikers-guide-lame-duck-session-congres

The Congressional schedule for this lame duck session is remarkably abbreviated. The House and Senate are both slated to next meet on Tuesday, November 13. That's a little later simply because that Monday is Veterans' Day. The Senate hasn't set any schedule other than a procedural vote at 5:30 pm on "The Sportsmen Act." But the House plans to be in session through the 16th and then take off the next week for Thanksgiving. The House then comes back November 27-30, December 3-6 and December 11-14. That's an incredible time-crunch. For starters, no one on Capitol Hill is anticipating the House freshman to start arriving until the week of November 13th. Then there are leadership elections in both bodies. House Minority Leader Nancy Pelosi (D-CA) says Democratic leadership elections won't hit until November 29. So in addition to figuring out which party is in charge of what (if electoral disputes linger), it doesn't look like Congress can truly get down to business on the pressing legislative issues until December.

#### Wind PTC

Peter Schorsch (Executive Editor of SaintPetersblog and President of Extensive Enterprises Online, LLC) November 8, 2012 “Lawmakers face a busy lame duck session” http://saintpetersblog.com/2012/11/lawmakers-face-a-busy-lame-duck-session/

Wind energy tax credits: “After simmering for the better part of this year, the battle over the wind-energy production tax credit will reach a fevered pitch during the lame-duck session. But supporters and detractors of the policy, which will expire at year’s end unless both chambers vote to renew it, acknowledge that the tax credit’s fate hinges less on its own particular merit and more on how successful lawmakers are at striking a deal to extend a wide range of tax extenders.”

#### Fallback deal solves the impact

Robert Schroeder (writer for MarketWatch) October 25, 2012 “Of 5 'fiscal cliff' outcomes only 1 is disaster” Lexis

New deal: There's no shortage of advice for the White House and Congress on how to avoid the fiscal cliff and rein in the deficit. So why shouldn't they take it? In the event that lame-duck negotiations between Obama and Republicans blow up, they could fall back on something like a recently released framework from the Bipartisan Policy Center. The suggested legislation envisions turning off the fiscal cliff, but would require a down payment of tax and spending changes that would be built on as part of a bigger debt reduction package in 2013. The aim is to save $4 trillion over 10 years. It's doubtful that the president and lawmakers would simply take a single policy group's advice wholesale. But elements could wind up in a surprise deal.

#### Plan popular

Koplow, ‘11

[Doug, founder of Earth Track, Inc., has worked on natural resource subsidy issues for more than 20 years, mainly in the energy sector, holds a B.A. in economics from Wesleyan University, M.B.A. from the Harvard Graduate School of Business Administration, Union of Concerned Scientists, February, “Nuclear Power: Still Not Viable Without Subsidies,” http://www.ucsusa.org/assets/documents/nuclear\_power/nuclear\_subsidies\_report.pdf]

The industry and its allies are now pressuring all levels of government for large new subsidies to support the construction and operation of a new generation of reactors and fuel-cycle facilities. The substantial political support the industry has attracted thus far rests largely on an uncritical acceptance of the industry’s economic claims and an incomplete understanding of the subsidies that made—and continue to make—the existing nuclear fleet possible.

#### Not intrinsic – rational policymaker can do the plan and avoid fiscal cliff

#### PC not key

**Klein, 3/19/12** [The Unpersuaded Who listens to a President? by [Ezra Klein](http://www.newyorker.com/magazine/bios/ezra_klein/search?contributorName=ezra%20klein) March 19, 2012, Ezra Klein is the editor of Wonkblog and a columnist at the Washington Post, as well as a contributor to MSNBC and Bloomberghttp://www.newyorker.com/reporting/2012/03/19/120319fa\_fact\_klein#ixzz1p36PrMbH]

This, Edwards says, is the reality facing modern Presidents, and one they would do well to accommodate. “In a rational world, strategies for governing should match the opportunities to be exploited,” he writes. “Barack Obama is only **the latest** in a **long line** of presidents who have not been able to transform the political landscape **through** their efforts at **persuasion**. When he succeeded in achieving major change, it was by mobilizing those ***predisposed* to support** him and driving legislation through Congress on a party-line vote.”

That’s easier said than done. We don’t have a system of government set up for Presidents to drive legislation through Congress. Rather, we have a system that was designed to encourage division between the branches but to resist the formation of political parties. The parties formed anyway, and they now use the branches to compete with one another. Add in minority protections like the filibuster, and you have a system in which the job of the President is to persuade an opposition party that has both the incentive and the power to resist him.

Jim Cooper says, “We’ve effectively lost our Congress and gained a parliament.” He adds, “At least a Prime Minister is empowered to get things done,” but “we have the extreme polarization of a parliament, with party-line voting, without the empowered Prime Minister.” And you can’t solve that with a speech.

#### Winners win

**Halloron, 10** [Liz, National Public Radio, “For Obama what a difference a win will make”, <http://www.npr.org/templates/story/story.php?storyId=125594396>]

Amazing what a win in a **major legislative battle** will do for a president's spirit. (Turmoil over spending and leadership at the Republican National Committee over the past week, and the release Tuesday of a major new and largely sympathetic book about the president by New Yorker editor David Remnick, also haven't hurt White House efforts to drive its own, new narrative.) Obama's Story New Yorkereditor David Remnick has a new book out about Obama. Listen to an interview with Remnick and read a review. ['The Bridge': Remnick On The Ascent Of Obama](http://www.npr.org/templates/story/story.php?storyId=125595945&ps=rs) April 6, 2010 ['Bridge' Tells Obama's Story, Just As We Remember It](http://www.npr.org/templates/story/story.php?storyId=125093691&ps=rs) April 5, 2010 Though the president's national job approval ratings failed to get a boost by the passage of the health care overhaul — his numbers have remained steady this year at just under 50 percent — he has earned grudging respect even from those who don't agree with his policies. "He's achieved something that virtually everyone in Washington thought he couldn't," says Henry Olsen, vice president and director of the business-oriented American Enterprise Institute's National Research Initiative. "And that's given him confidence." The protracted health care battle looks to have taught the White House something about power, says presidential historian Gil Troy — a lesson that will inform Obama's pursuit of his initiatives going forward. "I think that Obama realizes that **presidential power is a muscle**, and the more you exercise it, the stronger it gets," Troy says. "He exercised that power and had a success with health care passage, and now he wants to make sure people realize it's not just a blip on the map." The White House now has an opportunity, he says, to change the narrative that had been looming — that the Democrats would lose big in the fall midterm elections, and that Obama was looking more like one-term President Jimmy Carter than two-termer Ronald Reagan, who also managed a difficult first-term legislative win and survived his party's bad showing in the midterms. Approval Ratings Obama is exuding confidence since the health care bill passed, but his approval ratings as of April 1 remain unchanged from the beginning of the year, according to [Pollster.com](http://www.pollster.com/polls/us/jobapproval-obama.php). What's more, just as many people disapprove of Obama's health care policy now as did so at the beginning of the year. According to the most recent numbers: Forty-eight percent of all Americans approve of Obama, and 47 disapprove. Fifty-two percent disapprove of Obama's health care policy, compared with 43 percent who approve. **Stepping Back From A Precipice** Those watching the re-emergent president in recent days say it's difficult to imagine that it was only weeks ago that Obama's domestic agenda had been given last rites, and pundits were preparing their pieces on a failed presidency. Obama himself had framed the health care debate as a referendum on his presidency. A loss would have "ruined the rest of his presidential term," says Darrell West, director of governance studies at the liberal-leaning Brookings Institution. "It would have made it difficult to address other issues and emboldened his critics to claim he was a failed president." The conventional wisdom in Washington after the Democrats lost their supermajority in the U.S. Senate when Republican Scott Brown won the Massachusetts seat long held by the late Sen. Edward Kennedy was that Obama would scale back his health care ambitions to get something passed. "I thought he was going to do what most presidents would have done — take two-thirds of a loaf and declare victory," says the AEI's Olsen. "But he doubled down and made it a vote of confidence on his presidency, parliamentary-style." "You've got to be impressed with an achievement like that," Olsen says. But Olsen is among those who argue that, long-term, Obama and his party would have been better served politically by an incremental approach to reworking the nation's health care system, something that may have been more palatable to independent voters Democrats will need in the fall. "He would have been able to show he was listening more, that he heard their concerns about the size and scope of this," Olsen says. **Muscling out a win** on a sweeping health care package may have invigorated the president and **provided evidence of leadership**, but, his critics say, it remains to be seen whether Obama and his party can reverse what the polls now suggest is a losing issue for them. **Golden Boy Tested** One of the questions that has trailed Obama is how he would deal with criticism and the prospect of failure, says Troy, a McGill University history professor and visiting scholar affiliated with the bipartisan Policy Center in Washington. "He is one of those golden boys who never failed in his life, and people like that are often not used to criticism and failure," Troy says. Obama and his campaign were temporarily knocked for a loop early in the 2008 presidential campaign by then-GOP vice presidential candidate Sarah Palin's "zingers," Troy says, "and Obama was thrown off balance again by the loss of the Massachusetts Senate seat." The arc of the health care debate reminded observers that Obama is not just a product of Harvard, but also of tough Chicago politics, Troy says. "You don't travel as far and as fast as Barack Obama without having a spine of steel," he says. "He has an ability to regenerate, to come back, and knows that there is no such thing as a dirty win: a win is a win" — even if it infuriates the progressive wing of the president's party, which wanted far more sweeping changes to the nation's health care system. **GOP Stumbles** Obama's new mojo has been abetted, in a way, by high-profile troubles at the Republican National Committee. RNC Chairman Michael Steele has been under fire over the past week for his spending on private jets and limousines, and a staffer resigned after submitting to the committee a nearly $2,000 tab for a visit by young party members to a risque Los Angeles nightclub. The disarray intensified Monday with the resignation of the committee's chief of staff, and growing anger among top GOP strategists and fundraisers. "Steele has kept Republicans off-message," says West, of Brookings. "Every story about RNC spending is one less story about their views on health care at a time when news coverage has shifted in a more favorable direction." The distraction continued Monday when detractors accused Steele of playing the race card after he told ABC News that as an African American, he, like Obama, is being held to a higher standard. White House Spokesman Robert Gibbs, when asked about Steele's assertion, said the RNC chairman's problem "isn't the race card, it's the credit card." The controversy, Olsen says, hasn't been good for the Republicans' preparations for elections in terms of money and organization. But he doesn't view it as "a voter issue." **How Win Translates** When Reagan won his tough legislative battle in the early 1980s, it was over tax cuts, something voters saw as directly related to the then-dismal economy. Obama has long made a case for health care reform as a big piece of economic reform, but it's a difficult argument to make to voters, Olsen says, particularly when many of the health care law's major provisions don't go into effect for another four years. But observers like Troy say they believe that though initially unrelated, a boost in employment among Americans would encourage voters to look more favorably on the health care overhauls. "The perceived success of health care legislation rides on job creation," Troy says. Economists have recently declared the nation's recession, which began in 2007, over. But the unemployment rate has remained stubbornly at just under 10 percent. "I think he understands he's in a crucial period of his presidency," Olsen says. "He's taken a lot of risks, and there's not immediate rewards." Obama faces continuing tests on other big domestic issues, including Wall Street reform, the economy and climate change, as well as myriad foreign policy challenges ranging from testy relations with Israel and uncertainties about Iran's nuclear capabilities, to wars in Iraq and Afghanistan. Late last month, the administration and Russia agreed to a new nuclear arms treaty that is expected to be signed Thursday in advance of an international summit in Washington. The world is waiting, Troy says, to see how the president's renewed confidence plays out on the international stage. But the newly invigorated president continues to encourage voters to wait and see what his efforts produce.

#### No compromise --- not enough time.

**Yellin**, **11/9**/2012 (Jessica – CNN Chief White House Correspondent, Analysis: Obama has limits on debt deal, CNN Politics, p. http://www.cnn.com/2012/11/09/politics/obama-debt-limit/index.html)

In his address at the White House Friday afternoon, the president stressed the importance of congressional action and compromise, including a bill to protect 98% of Americans who will experience a significant tax hike at the end of the year if a deal is not reached. "I've got the pen ready to sign the bill right away," Obama said in the White House East Room, referring to the plan to extend tax cuts for those making under $250,000 a year. "I'm ready to do it; I'm ready to do it." The president said the election proved Americans are on his side in regard to taxes and entitlement reform. "Our job is to get the majority in Congress to reflect the will of the people," he said, before adding he was encouraged by Boehner's openness to tax revenue. Obama held firm on the ideas he espoused on the campaign trail that were also included in a detailed plan the White House sent to Capitol Hill in fall 2011. But there is not much time to negotiate before the new year, a time frame further limited by the Thanksgiving holiday and a just-announced trip by the president to Asia. Republicans sources argued it is unlikely the parties can resolve the sticking points in a lame-duck session of Congress, adding they need to agree on a framework deal that can be resolved in 2013. But don't expect any eye-popping new positions. Sources said the president believes he's been exceedingly clear about how he would like to avoid the painful cuts that would kick in. Throughout his campaign he reiterated his positions while also making clear he would not sign a bill that retained the current low tax rates for the richest Americans.

#### No PC

The Washington Times November 7, 2012 “EDITORIAL: Obama: A lame-duck president” http://www.washingtontimes.com/news/2012/nov/7/obama-a-lame-duck-president-lack-of-convincing-man/

When it comes to America’s problems, there will be no slowdown. The hard issues that were shunted aside until after the election will soon come due. The looming fiscal cliff will be Mr. Obama’s first post-election test. He is expected to try to make good on his pledge to close the budget gap through higher taxes on incomes, capital gains and dividends. This would depress markets, stifle growth and prevent job creation. It’s the perfect plan for people who want more of the same. Whether Mr. Obama can pull off his tax agenda is an open question. He lacks the political clout to get it through the Republican-led House, and he has shown no inclination to seek compromise. Leaving the House in GOP hands confirms the public’s ambivalence toward Mr. Obama. The American people did not want a repeat of the first-term orgy of big-ticket legislation that has left the government further awash in debt. Gridlock is a preferable alternative to Mr. Obama’s fiscal recklessness. After the election, the United States is left virtually where it was on Monday, with the same weak leadership facing mounting crises. Calling Mr. Obama a lame duck simply affirms what has been true all along.

# Round 8 – Aff v NU MP

## 1ac

### 1ac aquaculture

#### Advantage 1: Aquaculture

#### First the impacts:

#### 1) Fisheries – Fish stocks declining now—increased productivity key.

Brian **Kirke**, **2003**. Griffith University School of Engineering. “Enhancing fish stocks with wave-powered artificial upwelling,” Ocean and Coastal Management 46, http://www.cyberiad.net/library/pdf/bk\_ocm\_articleaspublished.pdf.

It has recently been estimated [1] that 75% of the world’s commercial fish stocks are being fished at or above mean sustainable levels. This situation is likely to get worse as the world’s population grows, unless one of two things happens: either consumption must be regulated—a difficult if not impossible task—or **productivity must be increased**. The change from hunting and gathering to cultivation and husbandry on land has supported a huge increase in the earth’s population over the last few thousand years, but the same has not happened to a significant extent in the oceans. Some agricultural techniques have had adverse effects on the land, but others have proven sustainable. These successful techniques generally emulate natural processes, such as the annual floods which replenish soil moisture and nutrients on some flood plains, or the nutrient pump action of deep-rooted plants. For example Yeomans [2] has shown how chisel ploughing and irrigation can increase the depth of biologically active soil, and Groocock [3] has demonstrated how productivity can be enhanced by mixing nutrient-rich clay subsoil with poor sandy topsoil. Ocean fisheries are still at the hunter-gatherer stage, and rather than developing ever more effective ways to further overexploit the existing finite resource, it is time to find ways to increase the resource by developing techniques **which enhance productivity in a sustainable way.**

#### Declining fish stocks will kill billions.

**Science**, 11/8/**2002**. “Poor to Feel Pinch of Rising Fish Prices,” Ebsco.

TOKYO— The first major attempt to project global supply and demand for fish has confirmed what many have long suspected: Rising prices are likely to drive fish out of the reach of growing numbers of poor people who rely on the sea for their protein. But, with several fisheries on the verge of collapse, some analysts believe that the study's dire projections—presented last week at the launching of a global research initiative on fisheries science and policy—might in fact be too rosy. The analysis, by agricultural economists in Penang, Malaysia, and in Washington, D.C., models fish supply and demand to 2020. Under the most likely scenario, it says, prices for salmon and other high-value fish would rise 15%, and prices for low-end fish such as milkfish and carp would increase by 6%. Fish meal prices, it estimates, would jump 18% to satisfy rising demand for feed for cultured, carnivorous high-value fish (below). “The consequences [of current trends] could be dire, depending on whether supply gains are feasible,” says Mahfuzuddin Ahmed, a co-author of the study, which was done by the Penang-based WorldFish Center and the Washington, D.C.-based International Food Policy Research Institute. But a continuation of those gains—which have produced a sixfold rise in total fish catch since the 1950s—is doubtful, says his boss, center director Meryl Williams, because three-quarters of the current catch comes from fish stocks that are already overfished, if not depleted. “Those [who study] the population dynamics of fisheries would probably be pessimistic” about supplies, she says. Fish now account for about 7% of the total food supply, according to the center, **and are the primary source of protein for roughly one-sixth of the world's population**. Yet fish consumption is generally overlooked in food supply models, which focus primarily on cereals and legumes. Scientists hope to correct that oversight with Fish for All, an initiative to develop science-based policy alternatives for world fisheries. Scientists, environmentalists, and industry representatives from 40 countries gathered in Penang last week for a meeting to launch the effort, led by the WorldFish Center, formerly known as the International Center for Living Aquatic Resources. Both the fish center and the policy institute are part of the World Bank-funded Consultative Group on International Agricultural Research.

#### Independently, Food shortages cause extinction

**Cribb 2010** [Julian, principal of JCA, fellow of the Australian Academy¶ of Technological Sciences and Engineering, “The Coming Famine: The¶ Global Food Crisis and What We Can Do to Avoid It”, pg 10]

The character of human conflict has also changed: since the early 1990S, more wars have been triggered by disputes over food, land, and water than over mere political or ethnic differences. This should not surprise US: people have fought over the means of survival for most of history. But in the abbreviated reports on the nightly media, and even in the rarefied realms of government policy, the focus is almost invariably on the players—the warring national, ethnic, or religious factions—rather than on the play, the deeper subplots building the tensions that ignite conflict. Caught up in these are groups of ordinary, desperate people fearful that there is no longer sufficient food, land, and water to feed their children—and believing that they must fight ‘the others” to secure them. At the same time, the number of refugees in the world doubled, many of them escaping from conflicts and famines precipitated by food and resource shortages. Governments in troubled regions tottered and fell. The coming famine is planetary because it involves both the immediate effects of hunger on directly affected populations in heavily populated regions of the world in the next forty years—and also the impacts of war, government failure, refugee crises, shortages, and food price spikes that will affect all human beings, no matter who they are or where they live. It is an emergency because unless it is solved, billions will experience great hardship, and not only in the poorer regions. Mike Murphy, one of the world’s most progressive dairy farmers, with operations in Ireland, New Zealand, and North and South America, succinctly summed it all up: “Global warming gets all the publicity but the real imminent threat to the human race is starvation on a massive scale. Taking a 10—30 year view, I believe that food shortages, famine and huge social unrest are probably the greatest threat the human race has ever faced. I believe future food shortages are a far bigger world threat than global warming.”2° The coming famine is also complex, because it is driven not by one or two, or even a half dozen, factors but rather by the confluence of many large and profoundly intractable causes that tend to amplify one another. This means that it cannot easily be remedied by “silver bullets” in the form of technology, subsidies, or single-country policy changes, because of the synergetic character of the things that power it.

#### 2) Oceans - Phytoplankton are the foundation of the food chain and produce half of the worlds oxygen—decline in phytoplankton risks extinction.

**UPI**, 6/6/**2008**. “Acidic oceans may tangle food chain,” <http://www.upi.com/Energy_Resources/2008/06/06/Acidic_oceans_may_tangle_food_chain/UPI-84651212763771/print/>.

Increased carbon levels in ocean water could have devastating impacts on marine life, scientists testified Thursday at a congressional hearing. Although most of the concern about carbon emissions has focused on the atmosphere and resulting temperature changes, accumulation of carbon dioxide in the ocean also could have disturbing outcomes, experts said at the hearing, which examined legislation that would create a program to study how the ocean responds to increased carbon levels. Ocean surface waters quickly absorb carbon dioxide from the atmosphere, so as carbon concentrations rise in the skies, they also skyrocket in the watery depths that cover almost 70 percent of the planet. As carbon dioxide increases in oceans, the acidity of the water also rises, and this change could affect a wide variety of organisms, said Scott Doney, senior scientist at the Woods Hole Oceanographic Institution, a non-profit research institute based in Woods Hole, Mass. "Greater acidity slows the growth or even dissolves ocean plant and animal shells built from calcium carbonate," Doney told representatives in the House Committee on Energy and the Environment. "Acidification thus threatens a wide range of marine organisms, from microscopic plankton and shellfish to massive coral reefs." If small organisms, like phytoplankton, are knocked out by acidity, the ripples would be far-reaching, said David Adamec, head of ocean sciences at the National Aeronautics and Space Administration. "If the amount of phytoplankton is reduced, you reduce the amount of photosynthesis going on in the ocean," Adamec told United Press International. "Those little guys are responsible for half of the oxygen you're breathing right now." A hit to microscopic organisms can also bring down a whole food chain. For instance, several years ago, an El Nino event wiped out the phytoplankton near the Galapagos Islands. That year, juvenile bird and seal populations almost disappeared. If ocean acidity stunted phytoplankton populations like the El Nino did that year, a similar result would occur -- but it would last for much longer than one year, potentially leading to extinction for some species, Adamec said. While it's clear increased acidity makes it difficult for phytoplankton to thrive, scientists don't know what level of acidity will result in catastrophic damages, said Wayne Esaias, a NASA oceanographer. "There's no hard and fast number we can use," he told UPI. In fact, although scientists can guess at the impacts of acidity, no one's sure what will happen in reality. Rep. Roscoe Bartlett, R-Md., pointed to this uncertainty at Thursday's hearing. "The ocean will be very different with increased levels of carbon dioxide, but I don't know if it will be better or worse," Bartlett said. However, even though it's not clear what the changes will be, the risk of doing nothing could be disastrous for ecosystems, said Ken Caldeira, a scientist at the Carnegie Institution for Science, a non-profit research organization. "The systems that are adapted to very precise chemical or climatological conditions will disappear and be replaced by species which, on land, we call weeds," Caldeira said. "What is the level of irreversible environmental risk that you're willing to take?" It's precisely this uncertainty that the Federal Ocean Acidification Research and Monitoring Act attempts to address. The bill creates a federal committee within the National Oceanic and Atmospheric Administration to monitor carbon dioxide levels in ocean waters and research the impacts of acidification. like Bishop. "**We would lose everything**," he told UPI.

#### The plan solves – Ocean Thermal Energy Conversion increases ocean nutrient content—improves fishing productivity.

Ivan **Goodbody and** Elizabeth **Thomas-Hope**, **2002**. Professor Emeritus in Zoology in the Department of Life Sciences and Professor of Environmental Management, Environmental Management Unit, Department of Geography and Geology University of the West Indies. Natural Resource Management for Sustainable Development in the Caribbean, p. 334.

One of the most important components of an OTEC system is a continuous supply of cold sea water pumped up from ocean depths. These ocean waters not only have low temperatures but they are also rich in nutrients. Compared to warm surface water, inorganic nitrate-nitrite values in deep cold water are 190 times higher, phosphate values 15 times higher, and silicate values 25 times higher. Aquaculturists have long **viewed such waters as a valuable resource that can be utilized for growing a mix of aquatic animals and plants**. This ability of the OTEC system to provide flexible, accurate, and consistent temperature control, high volume flow rates, and sea water that is relatively free of biological and chemical contaminants can be translated into a saleable aquaculture product.

#### OTEC results in net gains of plankton—this increases fishing harvests and solves phytoplankton

William **Avery**, **1994.** B.S. in chemistry from Pomona College and his A.M. and Ph.D. degrees in physical chemistry from Harvard. “Renewable energy from the ocean: a guide to OTEC,” p. 425-427.

Gains of plankton organisms may result some distance away from the OTEC plant as a result of increased nutrient input to euphotic zones that are associated with the shoaling of isopycnal and nutricline. Since plankton is important in the marine food chain, enhanced productivity due to redistribution of nutrients may improve fishing. Fish, which in general are attracted to offshore structures, are expected to increase their ambient concentration near OTEC plants. The world annual yield of marine fisheries is presently 70 million tons, with most fish caught on continental shelves. In fact, the open ocean (90% of the total ocean area) produces only about 0.7% of the fish because most of the nutrients in the surface water are extracted by plants and drift down to the ocean floor in the remains of plant or animal life. The water in the coastal zones is continually supplied with fresh nutrients in the runoff from the adjacent land and, hence, supports a high level of plant life activity and produces 54% of the fish. Only 0.1 % of the ocean area lies in the upwelling regions, where nutrient-laden water is brought up from the ocean depths, yet these regions produce 44% of the fish The reason for this spectacular difference can be seen in Table 9-9, which shows that the nitrate and phosphorus concentrations in deep seawater are about 150 and 5 times more, respectively, than their counterpart concentrations in surface water at a typical site (St. Croix in the Virgin Islands). Proposals to produce artificial upwelling, including one using nuclear power, have concluded that the cost would be excessive. Roels (1980) studied the possibility of using a shore-based OTEC plant to supply nutrient-laden water to a mariculture system, with a series of experiments carried out at St. Croix in the U.S. Virgin Islands. At that site the ocean is 1000 m deep only 1.6 km offshore. Three polyethylene pipelines, 6.9 em in diameter and 1830 m long, have brought approximately 250 liters/min of bottom water into 5-m3 pools where diatoms from laboratory cultures are grown. The food-laden effluent flows through metered channels to pools where shellfish are raised. The resulting protein production rate was excellent; 78% of the inorganic nitrogen in the deep seawater was converted to phytoplankton-protein nitrogen, and 22% of that was converted to clam-meat protein nitrogen. This compares with plant-protein/animal-protein conversion ratios of31 % for cows' milk production and 6.5% for feedlot beef production. The production of seafood is therefore more efficient than that of beef. Thus, shifts from beef to seafood, already underway in some societies for health reasons, could help to meet world needs for high-quality food. Net gains of plankton organisms may result some distance away from the OTEC plant as a result of increased nutrient input to the euphotic zone associated with the shoaling of isopycnal and nutricline. Increased harvests of small oceanic fish, which feed on plankton, would result.

#### OTEC externally solves food shortages through fertilizer production.

Christopher **Barry**, **2008**. Naval architect and co-chair of the Society of Naval Architects and Marine Engineers ad hoc panel on ocean renewable energy. “Ocean Thermal Energy Conversion and CO2 Sequestration,” renewenergy.wordpress.com/2008/07/01/ocean-thermal-energy-conversion-and-co2-sequestration/.

There might be an additional benefit: Another saying is "we aren't trying to solve world hunger," but we may have. Increased ocean fertility may enhance fisheries substantially. In addition, by using OTEC energy to make nitrogen fertilizers, we can improve agriculture in the developing world. OTEC fertilizer could be sold to developing countries at a subsidy in exchange for using the tropic oceans. If we can solve the challenges of OTEC, especially carbon sequestration, it would seem that the Branson Challenge is met, and we have saved the earth, plus solving world hunger. Since President Jimmy Carter originally started OTEC research in the '70's, he deserves the credit. I'm sure he will find a good use for Sir Richard's check.

### 1ac hegemony

#### Advantage 2: Hegemony

#### Investment in offshore OTEC is critical to US OTEC leadership and international OTEC development—this prevents Chinese hegemony.

Bill **Moore**, 4/12/**2006**. Discussion with Dr. Hans Jurgen Krock, the founder of OCEES on the revival of Ocean Thermal Energy Conversion. “OTEC Resurfaces,” <http://www.evworld.com/article.cfm?storyid=1008>.

While onshore installations like the one in Hawaii have their place in providing island communities with power, water, air conditioning and aquaculture, OCEES believes the real potential is offshore. The limiting factor for onshore is the size and length of the pipe needed to reach deep, cold water. Offshore production requires relatively short pipes that can be much larger in diameter that drop straight down below the platform. Krock said he is confident that we can now built 100 megawatt plants and he can foresee the day when 500 megawatt and 1000 megawatt (1 gigawatt) plants will be possible. Because the resource is far out into the ocean, far away from any national political entity, it isn't under the jurisdiction of any particular nation. "So countries such as Switzerland or others could go out there and be completely self-sufficient in energy by having their own energy supply in the tropical zone on the high seas far outside anybody‘s two hundred mile economic zone." Global Warming's Benefit Krock explained that the solar energy stored in the world's oceans is what drives the planet's weather and that a single category five hurricane generates more energy in a day than all mankind uses in a year. This may be the only benefit of global warming, providing even more warm water from which to produce power. "The ocean has increased in temperature by about point six degrees. That extra amount of heat that is in the ocean that has been stored in there over, say, the last forty years; that amount of heat, that amount of energy is enough to run all of humankind's energy requirements for the next five hundred years... just the extra." I asked Dr. Krock about two potential drawbacks to OTEC: environmental disruption and susceptibility to storm damage. He explained that his team has carefully looked at the first issue, environmental disruption, and determined that there would be none despite bringing up hundreds of millions of gallons of water a day to run the facility, because the water could be shunted back down to a level in the ocean where it would be neutrally buoyant. As to the question of tropical storms like typhoons or hurricanes and the risk they might pose for offshore OTEC platforms, he explained that these storms form outside of a tropical zone which extends approximately 4-5 degrees above and below the equator. Platforms operating within this narrower belt won't have to worry about these powerful storms and the damage they might cause, though he does plan to engineer for such contingencies. Unlike the illustration above that uses propellers to drive the plant, Krock's concept for moving the "grazing" OTEC mini-islands would rely on two intriguing systems: thrust vectoring and ocean current "sails". An OTEC plant generates a great deal of thrust from the uptake and expulsion of seawater, which can be directed to gradually move the platform in a desired direction. The 1000-feet stand pipe below the plant is like an inverted mast on a sailing ship. Sensors can detect the direction of the current at various depths, allowing the deployment of underwater "sails" that could also be used to passively steer the plant. "There is nothing better than working with nature," Krock commented. "This is simply a model on a human scale of the world's hydrological cycle." When compared to other renewable energy sources such as wind and biomass, he calls the heat energy stored in the ocean as the "elephant in the room". Krock envisions a plant made of floating concrete that is five square acres in size and could include fish processing facilities, ocean mineral mining and refining and the aforementioned rocket launch pad. An earlier Lockheed design was circular, measured some 100 meters in diameter and would generate 500 megawatts of electric power. "This is a transformation of endeavors from land to the ocean. The world is 70 percent oceans, 30 percent [land]... which we have used up to a large extent. The only major resource we have left is the ocean. This is a mechanism to utilize the ocean." "We do not have the luxury of waiting far into the future because I am sure you have read peak oil is coming... Unless we do this now, a transformation of this magnitude takes time. We have to allocate at least 50 years to do this, but that means we have to start now, because in fifty years we won't have the luxury of having another energy source to let us do the construction for these things. "The United States is the best placed of any country in the world to do this," he contends. "The United States is the only country in the world of any size whose budget for its navy is bigger than the budget for its army." It's his contention that this will enable America to assume a leadership position in OTEC technology, allowing it to deploy plants in the Atlantic, Caribbean and Pacific, but he offers a warming. "If we are stupid enough not to take advantage of this, well then this will be China's century and not the American century." Krock is currently negotiating with the U.S. Navy to deploy first working OTEC plant offshore of a British-controlled island in the Indian Ocean -- most likely Diego Garcia though he wouldn't confirm this for security purposes.

#### China’s rise risks war with the U.S. and threatens kicking the U.S. out of Asia.

John **Mearsheimer**, January **2005**. Professor of political science at the University of Chicago, Foreign Policy, <http://www.foreignpolicy.com/story/cms.php?story_id=2740>.

China cannot rise peacefully, and if it continues its dramatic economic growth over the next few decades, the United States and China are likely to engage in an intense security competition with considerable potential for war. Most of China’s neighbors, including India, Japan, Singapore, South Korea, Russia, and Vietnam, will likely join with the United States to contain China’s power. To predict the future in Asia, one needs a theory that explains how rising powers are likely to act and how other states will react to them. My theory of international politics says that the mightiest states attempt to establish hegemony in their own region while making sure that no rival great power dominates another region. The ultimate goal of every great power is to maximize its share of world power and eventually dominate the system. The international system has several defining characteristics. The main actors are states that operate in anarchy—which simply means that there is no higher authority above them. All great powers have some offensive military capability, which means that they can hurt each other. Finally, no state can know the future intentions of other states with certainty. The best way to survive in such a system is to be as powerful as possible, relative to potential rivals. The mightier a state is, the less likely it is that another state will attack it. The great powers do not merely strive to be the strongest great power, although that is a welcome outcome. Their ultimate aim is to be the hegemon—the only great power in the system. But it is almost impossible for any state to achieve global hegemony in the modern world, because it is too hard to project and sustain power around the globe. Even the United States is a regional but not a global hegemon. The best outcome that a state can hope for is to dominate its own backyard. States that gain regional hegemony have a further aim: to prevent other geographical areas from being dominated by other great powers. Regional hegemons, in other words, do not want peer competitors. Instead, they want to keep other regions divided among several great powers so that these states will compete with each other. In 1991, shortly after the Cold War ended, the first Bush administration boldly stated that the United States was now the most powerful state in the world and planned to remain so. That same message appeared in the famous National Security Strategy issued by the second Bush administration in September 2002. This document’s stance on preemptive war generated harsh criticism, but hardly a word of protest greeted the assertion that the United States should check rising powers and maintain its commanding position in the global balance of power. China is likely to try to dominate Asia the way the United States dominates the Western Hemisphere. Specifically, China will strive to maximize the power gap between itself and its neighbors, especially Japan and Russia, and to ensure that no state in Asia can threaten it. It is unlikely that China will go on a rampage and conquer other Asian countries. Instead, China will want to dictate the boundaries of acceptable behavior to neighboring countries, much the way the United States does in the Americas. An increasingly powerful China is also likely to try to push the United States out of Asia, much the way the United States pushed the European great powers out of the Western Hemisphere. Not incidentally, gaining regional hegemony is probably the only way that China will get back Taiwan. Why should we expect China to act differently than the United States? U.S. policymakers, after all, react harshly when other great powers send military forces into the Western Hemisphere. These foreign forces are invariably seen as a potential threat to American security. Are the Chinese more principled, more ethical, less nationalistic, or less concerned about their survival than Westerners? They are none of these things, which is why China is likely to imitate the United States and attempt to become a regional hegemon. China’s leadership and people remember what happened in the last century, when Japan was powerful and China was weak. In the anarchic world of international politics, it is better to be Godzilla than Bambi. It is clear from the historical record how American policymakers will react if China attempts to dominate Asia. The United States does not tolerate peer competitors. As it demonstrated in the 20th century, it is determined to remain the world’s only regional hegemon. Therefore, the United States will seek to contain China and ultimately weaken it to the point where it is no longer capable of dominating Asia. In essence, the United States is likely to behave toward China much the way it behaved toward the Soviet Union during the Cold War.

**Unchecked Chinese rise causes global nuclear war**

Walton 7 – C. Dale Walton, Lecturer in International Relations and Strategic Studies at the University of Reading, 2007, Geopolitics and the Great Powers in the 21st Century, p. 49

Obviously, it is of vital importance to the United States that the PRC does not become the hegemon of Eastern Eurasia. As noted above, however, regardless of what Washington does, China's success in such an endeavor is not as easily attainable as pessimists might assume. The PRC appears to be on track to be a very great power indeed, but geopolitical conditions are not favorable for any Chinese effort to establish sole hegemony; a robust multipolar system should suffice to keep China in check, even with only minimal American intervention in local squabbles. The more worrisome danger is that Beijing will cooperate with a great power partner, establishing a very muscular axis. Such an entity would present a critical danger to the balance of power, thus both necessitating very active American intervention in Eastern Eurasia and creating the underlying conditions for a massive, and probably nuclear, great power war. Absent such a "super-threat," however, the demands on American leaders will be far more subtle: creating the conditions for Washington's gentle decline from playing the role of unipolar quasi-hegemon to being "merely" the greatest of the world's powers, while aiding in the creation of a healthy multipolar system that is not marked by close great power alliances.

#### OTEC key to mineral extraction.

**Celestopea Times**, **2005**. A monthly online journal dedicated to finding sustainable solutions for the future. “OTEC,” <http://www.celestopea.com/OTEC.htm>.

Many minerals and chemicals can also be derived as byproducts of OTEC operation from the 57 elements dissolved in solution in seawater. Besides the fuels hydrogen, oxygen and methanol, other byproducts include ammonia, salt, chlorine and eventually gold, platinum and other rare and precious elements. Past corporate analysis has always shown such ventures to be unprofitable because of the cost of pumping the large volume of water necessary to extract significant amounts of minerals. This main stumbling block is overcome as the OTEC's will already be pumping vast quantities of water for other purposes. The necessary mining technology is leaping forward as well. The Japanese have recently been experimenting with extraction of uranium from seawater and found pending technology in material sciences is making mining minerals from seawater feasible.

#### Rare earths are critical to all military systems

**Richardson 10** (Michael, 10/18, visiting senior research fellow at the Institute of South East Asian Studies in Singapore, Yale Global Online, “China’s Chokehold On Rare-Earth Minerals Raises Concerns ,” <http://yaleglobal.yale.edu/content/chinas-rare-earth-minerals>, 11/16,)

Yet China could keep its dominant grip on the rare-earths industry for some years. It holds 35 percent of global reserves, but supplies over 95 percent of demand for rare-earth oxides, of which 60 percent is domestic, according to Industrial Minerals Company of Australia, a consultancy. Just as important, Chinese companies, many of them state-controlled, have advanced in their quest to make China the world leader in processing rare-earth metals into finished materials. Success in this quest could give China a decisive advantage not just in civilian industry, including clean energy, but also in military production if Chinese manufacturers were given preferential treatment over foreign competitors. Cerium is the most abundant of the 17 rare earths, all of which have similar chemical properties. A cerium-based coating is non-corrosive and has significant military applications. The Pentagon is due to finish a report soon on the risks of US military dependence on rare earths from China. Their use is widespread in the defense systems of the US, its allies, and other countries that buy its weapons and equipment. In a report to the US Congress in April, the Government Accountability Office said that it had been told by officials and defense industry executives that where rare-earth alloys and other materials were used in military systems, they were “responsible for the functionality of the component and would be difficult to replace without losing performance.” For example, fin actuators in precision-guided bombs are specifically designed around the capabilities of neodymium iron boron rare-earth magnets. The main US battle tank, the M1A2 Abrams, has a reference and navigation system that relies on samarium cobalt magnets from China. An official report last year on the US national defense stockpile said that shortages of four rare earths – lanthanum, cerium, europium and gadolinium – had already caused delays in producing some weapons. It recommended further study to determine the severity of the delays.

#### OTEC key to overall US technological leadership.

R. **Ramesh**, K **Udayakumar**, **and** M **Anandakrishnan**, **1997**. Centre for Water Resources and Ocean Management Anna University, India., School of Electrical and Electronics Centre for Water Resources and Ocean Management Anna University, India, and Former Vice Chancellor, Anna University, Tamil Nadu State Council for higher Education. “Renewable Energy Technologies,” pg. 33.

﻿6.2 Non-economic Benefits

﻿The non-economic benefits of OTEC which facilitate achievement of goals are: **promotion of the country’s competitiveness** and international trade, enhancement of energy independence and security, promotion of international political stability, and a potential for control of greenhouse emissions. Maintenance of leadership in 10 the technology development is crucial to the capability of a significant share of the market in the global market for such systems exploitable energy resource available to a large number of countries, particularly developing countries, represents long-term export opportunities. Development of OTEC technology would mitigate dependence on external sources of energy for remote and. A viable OTEC commercial sector also **support national defense by enhancing related maritime industry** and by providing energy and water options for remote island defence installations.

#### That’s key to hegemony.

Adam **Segal**, November/December **2004**. Senior Fellow in China Studies at the Council on Foreign Relations. “Is America Losing Its Edge?” Foreign Affairs, <http://www.foreignaffairs.org/20041101facomment83601/adam-segal/is-america-losing-its-edge.html>.

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

#### Perception of decline will cause the US to lashout---triggers hegemonic wars

Goldstein 7 Professor of Global Politics and International Relations @ University of Pennsylvania “Power transitions, institutions, and China's rise in East Asia: Theoretical expectations and evidence,” Journal of Strategic Studies, Volume 30, Issue 4 & 5 August 2007, pages 639 – 682

Two closely related, though distinct, theoretical arguments focus explicitly on the consequences for international politics of a shift in power between a dominant state and a rising power. In War and Change in World Politics, Robert Gilpin suggested that peace prevails when a dominant state’s capabilities enable it to ‘govern’ an international order that it has shaped. Over time, however, as economic and technological diffusion proceeds during eras of peace and development, other states are empowered. Moreover, the burdens of international governance drain and distract the reigning hegemon, and challengers eventually emerge who seek to rewrite the rules of governance. As the power advantage of the erstwhile hegemon ebbs, it may become desperate enough to resort to the ultima ratio of international politics, force**,** to forestall the increasingly urgent demands of a rising challenger. Or as the power of the challenger rises, it may be tempted to press its case with threats to use force. It is the rise and fall of the great powers that creates the circumstances under which major wars, what Gilpin labels ‘hegemonic wars’, break out.13 Gilpin’s argument logically encourages pessimism about the implications of a rising China. It leads to the expectation that international trade, investment, and technology transfer will result in a steady diffusion of American economic power, benefiting the rapidly developing states of the world, including China. As the US simultaneously scurries to put out the many brushfires that threaten its far-flung global interests (i.e., the classic problem of overextension), it will be unable to devote sufficient resources to maintain or restore its former advantage over emerging competitors like China. While the erosion of the once clear American advantage plays itself out, the US will find it ever more difficult to preserve the order in Asia that it created during its era of preponderance. The expectation is an increase in the likelihood for the use of force – either by a Chinese challenger able to field a stronger military in support of its demands for greater influence over international arrangements in Asia, or by a besieged American hegemon desperate to head off further decline. Among the trends that alarm those who would look at Asia through the lens of Gilpin’s theory are China’s expanding share of world trade and wealth (much of it resulting from the gains made possible by the international economic order a dominant US established); its acquisition of technology in key sectors that have both civilian and military applications (e.g., information, communications, and electronics linked with to forestall, and the challenger becomes increasingly determined to realize the transition to a new international order whose contours it will define. the ‘revolution in military affairs’); and an expanding military burden for the US (as it copes with the challenges of its global war on terrorism and especially its struggle in Iraq) that limits the resources it can devote to preserving its interests in East Asia.14 Although similar to Gilpin’s work insofar as it emphasizes the importance of shifts in the capabilities of a dominant state and a rising challenger, the power-transition theory A. F. K. Organski and Jacek Kugler present in The War Ledger focuses more closely on the allegedly dangerous phenomenon of ‘crossover’– the point at which a dissatisfied challenger is about to overtake the established leading state.15 In such cases, when the power gap narrows, the dominant state becomes increasingly desperate. Though suggesting why a rising China may ultimately present grave dangers for international peace when its capabilities make it a peer competitor of America, Organski and Kugler’s power-transition theory is less clear about the dangers while a potential challenger still lags far behind and faces a difficult struggle to catch up. This clarification is important in thinking about the theory’s relevance to interpreting China’s rise because a broad consensus prevails among analysts that Chinese military capabilities are at a minimum two decades from putting it in a league with the US in Asia.16 Their theory, then, points with alarm to trends in China’s growing wealth and power relative to the United States, but especially looks ahead to what it sees as the period of maximum danger – that time when a dissatisfied China could be in a position to overtake the US on dimensions believed crucial for assessing power. Reports beginning in the mid-1990s that offered extrapolations suggesting China’s growth would give it the world’s largest gross domestic product (GDP aggregate, not per capita) sometime in the first few decades of the twentieth century fed these sorts of concerns about a potentially dangerous challenge to American leadership in Asia.17 The huge gap between Chinese and American military capabilities (especially in terms of technological sophistication) has so far discouraged prediction of comparably disquieting trends on this dimension, but inklings of similar concerns may be reflected in occasionally alarmist reports about purchases of advanced Russian air and naval equipment, as well as concern that Chinese espionage may have undermined the American advantage in nuclear and missile technology, and speculation about the potential military purposes of China’s manned space program.18 Moreover, because a dominant state may react to the prospect of a crossover and believe that it is wiser to embrace the logic of preventive war and act early to delay a transition while the task is more manageable, Organski and Kugler’s power-transition theory also provides grounds for concern about the period prior to the possible crossover.19 pg. 647-650

#### U.S. leadership deters conflict and solves their impacts—collapse results in cascading great power wars

**Thayer 2006** [Bradley A., Assistant Professor of Political Science at the University of Minnesota, Duluth, The National Interest, November -December, “In Defense of Primacy”, lexis]

A remarkable fact about international politics today--in a world where American primacy is clearly and unambiguously on display--is that countries want to align themselves with the United States. Of course, this is not out of any sense of altruism, in most cases, but because doing so allows them to use the power of the United States for their own purposes--their own protection, or to gain greater influence. Of 192 countries, 84 are allied with America--their security is tied to the United States through treaties and other informal arrangements--and they include almost all of the major economic and military powers. That is a ratio of almost 17 to one (85 to five), and a big change from the Cold War when the ratio was about 1.8 to one of states aligned with the United States versus the Soviet Union. Never before in its history has this country, or any country, had so many allies. U.S. primacy--and the bandwagoning effect--has also given us extensive influence in international politics, allowing the United States to shape the behavior of states and international institutions. Such influence comes in many forms, one of which is America's ability to create coalitions of like-minded states to free Kosovo, stabilize Afghanistan, invade Iraq or to stop proliferation through the Proliferation Security Initiative (PSI). Doing so allows the United States to operate with allies outside of the UN, where it can be stymied by opponents. American-led wars in Kosovo, Afghanistan and Iraq stand in contrast to the UN's inability to save the people of Darfur or even to conduct any military campaign to realize the goals of its charter. The quiet effectiveness of the PSI in dismantling Libya's WMD programs and unraveling the A. Q. Khan proliferation network are in sharp relief to the typically toothless attempts by the UN to halt proliferation. You can count with one hand countries opposed to the United States. They are the "Gang of Five": China, Cuba, Iran, North Korea and Venezuela. Of course, countries like India, for example, do not agree with all policy choices made by the United States, such as toward Iran, but New Delhi is friendly to Washington. Only the "Gang of Five" may be expected to consistently resist the agenda and actions of the United States. China is clearly the most important of these states because it is a rising great power. But even Beijing is intimidated by the United States and refrains from openly challenging U.S. power. China proclaims that it will, if necessary, resort to other mechanisms of challenging the United States, including asymmetric strategies such as targeting communication and intelligence satellites upon which the United States depends. But China may not be confident those strategies would work, and so it is likely to refrain from testing the United States directly for the foreseeable future because China's power benefits, as we shall see, from the international order U.S. primacy creates.

The other states are far weaker than China. For three of the "Gang of Five" cases--Venezuela, Iran, Cuba--it is an anti-U.S. regime that is the source of the problem; the country itself is not intrinsically anti-American. Indeed, a change of regime in Caracas, Tehran or Havana could very well reorient relations. THROUGHOUT HISTORY, peace and stability have been great benefits of an era where there was a dominant power--Rome, Britain or the United States today. Scholars and statesmen have long recognized the irenic effect of power on the anarchic world of international politics. Everything we think of when we consider the current international order--free trade, a robust monetary regime, increasing respect for human rights, growing democratization--is directly linked to U.S. power. Retrenchment proponents seem to think that the current system can be maintained without the current amount of U.S. power behind it. In that they are dead wrong and need to be reminded of one of history's most significant lessons: Appalling things happen when international orders collapse. The Dark Ages followed Rome's collapse. Hitler succeeded the order established at Versailles. Without U.S. power, the liberal order created by the United States will end just as assuredly. As country and western great Ral Donner sang: "You don't know what you've got (until you lose it)." Consequently, it is important to note what those good things are. In addition to ensuring the security of the United States and its allies, American primacy within the international system causes many positive outcomes for Washington and the world. The first has been a more peaceful world. During the Cold War, U.S. leadership reduced friction among many states that were historical antagonists, most notably France and West Germany. Today, American primacy helps keep a number of complicated relationships aligned--between Greece and Turkey, Israel and Egypt, South Korea and Japan, India and Pakistan, Indonesia and Australia. This is not to say it fulfills Woodrow Wilson's vision of ending all war. Wars still occur where Washington's interests are not seriously threatened, such as in Darfur, but a Pax Americana does reduce war's likelihood, particularly war's worst form: great power wars. Second, American power gives the United States the ability to spread democracy and other elements of its ideology of liberalism. Doing so is a source of much good for the countries concerned as well as the United States because, as John Owen noted on these pages in the Spring 2006 issue, liberal democracies are more likely to align with the United States and be sympathetic to the American worldview.3 So, spreading democracy helps maintain U.S. primacy. In addition, once states are governed democratically, the likelihood of any type of conflict is significantly reduced. This is not because democracies do not have clashing interests. Indeed they do. Rather, it is because they are more open, more transparent and more likely to want to resolve things amicably in concurrence with U.S. leadership. And so, in general, democratic states are good for their citizens as well as for advancing the interests of the United States. Critics have faulted the Bush Administration for attempting to spread democracy in the Middle East, labeling such an effort a modern form of tilting at windmills. It is the obligation of Bush's critics to explain why democracy is good enough for Western states but not for the rest, and, one gathers from the argument, should not even be attempted.

Of course, whether democracy in the Middle East will have a peaceful or stabilizing influence on America's interests in the short run is open to question. Perhaps democratic Arab states would be more opposed to Israel, but nonetheless, their people would be better off. The United States has brought democracy to Afghanistan, where 8.5 million Afghans, 40 percent of them women, voted in a critical October 2004 election, even though remnant Taliban forces threatened them. The first free elections were held in Iraq in January 2005. It was the military power of the United States that put Iraq on the path to democracy. Washington fostered democratic governments in Europe, Latin America, Asia and the Caucasus. Now even the Middle East is increasingly democratic. They may not yet look like Western-style democracies, but democratic progress has been made in Algeria, Morocco, Lebanon, Iraq, Kuwait, the Palestinian Authority and Egypt. By all accounts, the march of democracy has been impressive. Third, along with the growth in the number of democratic states around the world has been the growth of the global economy. With its allies, the United States has labored to create an economically liberal worldwide network characterized by free trade and commerce, respect for international property rights, and mobility of capital and labor markets. The economic stability and prosperity that stems from this economic order is a global public good from which all states benefit, particularly the poorest states in the Third World. The United States created this network not out of altruism but for the benefit and the economic well-being of America. This economic order forces American industries to be competitive, maximizes efficiencies and growth, and benefits defense as well because the size of the economy makes the defense burden manageable. Economic spin-offs foster the development of military technology, helping to ensure military prowess.

Perhaps the greatest testament to the benefits of the economic network comes from Deepak Lal, a former Indian foreign service diplomat and researcher at the World Bank, who started his career confident in the socialist ideology of post-independence India. Abandoning the positions of his youth, Lal now recognizes that the only way to bring relief to desperately poor countries of the Third World is through the adoption of free market economic policies and globalization, which are facilitated through American primacy.4 As a witness to the failed alternative economic systems, Lal is one of the strongest academic proponents of American primacy due to the economic prosperity it provides. Fourth and finally, the United States, in seeking primacy, has been willing to use its power not only to advance its interests but to promote the welfare of people all over the globe. The United States is the earth's leading source of positive externalities for the world. The U.S. military has participated in over fifty operations since the end of the Cold War--and most of those missions have been humanitarian in nature. Indeed, the U.S. military is the earth's "911 force"--it serves, de facto, as the world's police, the global paramedic and the planet's fire department. Whenever there is a natural disaster, earthquake, flood, drought, volcanic eruption, typhoon or tsunami, the United States assists the countries in need. On the day after Christmas in 2004, a tremendous earthquake and tsunami occurred in the Indian Ocean near Sumatra, killing some 300,000 people. The United States was the first to respond with aid. Washington followed up with a large contribution of aid and deployed the U.S. military to South and Southeast Asia for many months to help with the aftermath of the disaster. About 20,000 U.S. soldiers, sailors, airmen and marines responded by providing water, food, medical aid, disease treatment and prevention as well as forensic assistance to help identify the bodies of those killed. Only the U.S. military could have accomplished this Herculean effort. No other force possesses the communications capabilities or global logistical reach of the U.S. military. In fact, UN peacekeeping operations depend on the United States to supply UN forces. American generosity has done more to help the United States fight the War on Terror than almost any other measure. Before the tsunami, 80 percent of Indonesian public opinion was opposed to the United States; after it, 80 percent had a favorable opinion of America. Two years after the disaster, and in poll after poll, Indonesians still have overwhelmingly positive views of the United States. In October 2005, an enormous earthquake struck Kashmir, killing about 74,000 people and leaving three million homeless. The U.S. military responded immediately, diverting helicopters fighting the War on Terror in nearby Afghanistan to bring relief as soon as possible. To help those in need, the United States also provided financial aid to Pakistan; and, as one might expect from those witnessing the munificence of the United States, it left a lasting impression about America. For the first time since 9/11, polls of Pakistani opinion have found that more people are favorable toward the United States than unfavorable, while support for Al-Qaeda dropped to its lowest level. Whether in Indonesia or Kashmir, the money was well-spent because it helped people in the wake of disasters, but it also had a real impact on the War on Terror. When people in the Muslim world witness the U.S. military conducting a humanitarian mission, there is a clearly positive impact on Muslim opinion of the United States. As the War on Terror is a war of ideas and opinion as much as military action, for the United States humanitarian missions are the equivalent of a blitzkrieg. THERE IS no other state, group of states or international organization that can provide these global benefits. None even comes close. The United Nations cannot because it is riven with conflicts and major cleavages that divide the international body time and again on matters great and trivial. Thus it lacks the ability to speak with one voice on salient issues and to act as a unified force once a decision is reached. The EU has similar problems. Does anyone expect Russia or China to take up these responsibilities? They may have the desire, but they do not have the capabilities. Let's face it: for the time being, American primacy remains humanity's only practical hope of solving the world's ills.

### 1ac oil

#### Advantage 3: Oil

#### OTEC solves both power plants and vehicle emissions—key to reduce CO2

**Magesh 10** (R., Coastal Energ Pvt, "OTEC TEchnology - A World of Clean Energy and Water," World Congress on Engineering, Vol II, June 30)

Scientists all over the world are making ¶ predictions about the ill effects of Global warming and its ¶ consequences on the mankind. Conventional Fuel Fired Electric ¶ Power Stations contribute nearly 21.3% of the Global Green ¶ House Gas emission annually. Hence, an alternative for such ¶ Power Stations is a must to prevent global warming. One fine ¶ alternative that comes to the rescue is the Ocean thermal energy ¶ conversion (OTEC) Power Plant, the complete Renewable Energy ¶ Power Station for obtaining Cleaner and Greener Power. Even ¶ though the concept is simple and old, recently it has gained ¶ momentum due to worldwide search for clean continuous energy ¶ sources to replace the fossil fuels. The design of a 5 Megawatt ¶ OTEC Pre-commercial plant is clearly portrayed to brief the ¶ OTEC technical feasibility along with economic consideration ¶ studies for installing OTEC across the world. OTEC plant can be ¶ seen as a combined Power Plant and Desalination plant. ¶ Practically, for every Megawatt of power generated by hybrid ¶ OTEC plant, nearly 2.28 million litres of desalinated water is ¶ obtained every day. Its value is thus increased because many ¶ parts of the globe are facing absolute water scarcity. OTEC could ¶ produce enough drinking water to ease the crisis drought-stricken ¶ areas. The water can be used for local agriculture and industry, ¶ any excess water being given or sold to neighboring communities.¶ Index Terms—Desalinated water, Ocean Temperature ¶ Differences, Rankine Cycle, Renewable Energy.¶ I. INTRODUCTION¶ CEAN thermal energy conversion is a hydro energy ¶ conversion system, which uses the temperature difference ¶ that exists between deep and shallow waters in tropical seas to ¶ run a heat engine. The economic evaluation of OTEC plants ¶ indicates that their commercial future lies in floating plants of ¶ approximately 100 MW capacity for industrialized nations and ¶ smaller plants for small-island-developing-states (SIDS). The ¶ operational data is needed to earn the support required from ¶ the financial community and developers. Considering a 100 ¶ MW (4-module) system, a 1/5-scaled version of a 25 MW ¶ module is proposed as an appropriate size. A 5 MW precommercial plant is directly applicable in some SIDS. OTEC ¶ works on Rankine cycle, using a low-pressure turbine to ¶ generate electric power. There are two general types of OTEC ¶ design: closed-cycle plants utilize the evaporation of a working¶ fluid, such as ammonia or propylene, to drive the turbinegenerator, and open-cycle plants use steam from evaporated ¶ R. Magesh is with Coastal Energen Pvt. Ltd., Chennai 600 006, ¶ Tamilnadu, India (e-mail: wellingtonmagesh@ gmail.com). ¶ sea water to run the turbine. Another commonly known design, ¶ hybrid plants, is a combination of the two. In fact, the plants ¶ would cool the ocean by the same amount as the energy ¶ extracted from them. Apart from power generation, an OTEC ¶ plant can also be used to pump up the cold deep sea water for ¶ air conditioning and refrigeration, if it is brought back to ¶ shore. In addition, the enclosed sea water surrounding the ¶ plant can be used for aquaculture. Hydrogen produced by ¶ subjecting the steam to electrolysis during the OTEC process ¶ can fuel hybrid automobiles, provided hydrogen can be ¶ transported economically to sea shore. Another undeveloped ¶ opportunity is the potential to mine ocean water for its 57 ¶ elements contained in salts and other forms and dissolved in ¶ solution. The initial capital cost of OTEC power station would ¶ look high, but an OTEC plant would not involve the wastetreatment or astronomical decommissioning costs of a nuclear ¶ facility. Also, it would offset its expense through the sale of ¶ the desalinated water.

#### OTEC efficiently produces hydrogen—this will enable transition to a hydrogen economy.

Joseph **Huang and** Stephen **Oney**, July **2003**. Senior Scientist for the National Oceanic and Atmospheric Administration, Professor of Ocean &. Resources Engineering, University of Hawaii and PhD., executive vice present of OCEES. “Revisit Ocean Thermal Energy Conversion System,” http://www.springerlink.com/content/n864l3217156h045/fulltext.pdf.

Perhaps the largest contribution to human society and the global environment that OTEC will have is as the supplier of hydrogen for the impending hydrogen economy. The huge energy reservoir in the tropical ocean available via the OTEC process will require a transportable form of that energy to allow access by the energy demand centers in the temperate zone. The most attractive and versatile transportable energy form is hydrogen. There are natural synergies between OTEC and hydrogen production, especially liquid hydrogen (LH2), which other renewables such as wind and solar do not possess. These include: • Full and efficient utilization can be made of the investment in production capacity because OTEC is available 24 hours per day and 365 days per year. This is in contrast to most renewable energy systems such as wind, waves, tide, direct solar and photovoltaics. Also, OTEC systems cannot exhaust the resource at the location where they are installed – in contrast to oil, natural gas, geothermal or even hydroelectric (the reservoir eventually silts up); • The efficient production of hydrogen by electrolysis requires very pure water for the KOH solution. A small part of the OTEC process can be used to produce this pure water from the surface seawater, resulting in high efficiency electrolysis; • Liquefying hydrogen by the Claude process requires an efficient heat sink to minimize process energy. The Claude process, which cools compressed hydrogen gas with liquid nitrogen prior to expansion through a Joules-Thompson valve to complete the liquefaction process, requires a significant heat sink to maintain liquid nitrogen temperatures (Ministry of Economic Affairs and Technology 1989). The cold seawater that is used in the OTEC process could provide this efficient heat sink; • Liquid hydrogen is most efficiently transported by ocean tanker. The off-shore OTEC hydrogen plant is already located on the transport medium and therefore would result in the lowest cost for transport to market. From a global perspective, ocean transport distances of OTEC derived LH2 are much shorter than our present system of oil transport from the Middle East around Africa to North America or Europe or from the Middle East around India and the Malay Peninsula to Japan. The successful development of a global hydrogen economy will undoubtedly have to involve the largest renewable energy resource in the world – the tropical ocean. OTEC technology is the best way to tap into this virtually limitless thermal reservoir to produce hydrogen to support the impending hydrogen economy. Offshore OTEC plants, utilizing techniques already developed for accessing deep water oil fields, can be adapted to produce and liquefy hydrogen and ensure a sustainable supply of hydrogen from an environmentally benign, renewable resource for future generations.

#### That solves warming and independently prevents grid terrorism

Jeremy **Rifkin**, 12/5/**2002**. President of the Foundation on Economic Trends, degree in economics from the Wharton School of the University of Pennsylvania, and degree in international affairs from the Fletcher School of Law and Diplomacy at Tufts University. “Hydrogen: Empowering the People,” The Nation, <http://www.thenation.com/doc/20021223/rifkin>.

While the fossil-fuel era enters its sunset years, a new energy regime is being born that has the potential to remake civilization along radically new lines--hydrogen. Hydrogen is the most basic and ubiquitous element in the universe. It never runs out and produces no harmful CO2 emissions when burned; the only byproducts are heat and pure water. That is why it's been called "the forever fuel." Hydrogen has the potential to **end the world's reliance on oil**. Switching to hydrogen and creating a decentralized power grid would also be the best assurance against terrorist attacks aimed at disrupting the national power grid and energy infrastructure. Moreover, hydrogen power will **dramatically reduce carbon dioxide emissions and mitigate the effects of global warming**. In the long run, the hydrogen-powered economy will fundamentally change the very nature of our market, political and social institutions, just as coal and steam power did at the beginning of the Industrial Revolution.

#### Grid terrorism causes nuclear war

**Habiger**, 2/1**/2010** (Eugue – Retired Air Force General, Cyberwarfare and Cyberterrorism, The Cyber Security Institute, p. 11-19)

However, from a strategic defense perspective, there are enough warning signs to warrant preparation. In addition to the threat of cyberwar, the limited resources required to carry out even a large scale cyberattack also makes likely the potential for a significant cyberterror attack against the United States. However, the lack of a long list of specific incidences of cyberterrorism should provide no comfort. There is strong evidence to suggest that al Qaeda has the ability to conduct cyberterror attacks against the United States and its allies. Al Qaeda and other terrorist organizations are extremely active in cyberspace, using these technologies to communicate among themselves and others, carry out logistics, recruit members, and wage information warfare. For example, al Qaeda leaders used email to communicate with the 9‐11 terrorists and the 9‐11 terrorists used the Internet to make travel plans and book flights. Osama bin Laden and other al Qaeda members routinely post videos and other messages to online sites to communicate. Moreover, there is evidence of efforts that al Qaeda and other terrorist organizations are actively developing cyberterrorism capabilities and seeking to carry out cyberterrorist attacks. For example, the Washington Post has reported that “U.S. investigators have found evidence in the logs that mark a browser's path through the Internet that al Qaeda operators spent time on sites that offer software and programming instructions for the digital switches that run power, water, transport and communications grids. In some interrogations . . . al Qaeda prisoners have described intentions, in general terms, to use those tools.”25 Similarly, a 2002 CIA report on the cyberterror threat to a member of the Senate stated that al Qaeda and Hezbollah have become "more adept at using the internet and computer technologies.”26 The FBI has issued bulletins stating that, “U. S. law enforcement and intelligence agencies have received indications that Al Qaeda members have sought information on Supervisory Control And Data Acquisition (SCADA) systems available on multiple SCADA‐related web sites.”27 In addition a number of jihadist websites, such as 7hj.7hj.com, teach computer attack and hacking skills in the service of Islam.28 While al Qaeda may lack the cyber‐attack capability of nations like Russia and China, there is every reason to believe its operatives, and those of its ilk, are as capable as the cyber criminals and hackers who routinely effect great harm on the world’s digital infrastructure generally and American assets specifically. In fact, perhaps, the most troubling indication of the level of the cyberterrorist threat is the countless, serious non‐terrorist cyberattacks routinely carried out by criminals, hackers, disgruntled insiders, crime syndicates and the like. If run‐of‐the‐mill criminals and hackers can threaten powergrids, hack vital military networks, steal vast sums of money, take down a city’s of traffic lights, compromise the Federal Aviation Administration’s air traffic control systems, among other attacks, it is overwhelmingly likely that terrorists can carry out similar, if not more malicious attacks. Moreover, even if the world’s terrorists are unable to breed these skills, they can certainly buy them. There are untold numbers of cybermercenaries around the world—sophisticated hackers with advanced training who would be willing to offer their services for the right price. Finally, given the nature of our understanding of cyber threats, there is always the possibility that we have already been the victim or a cyberterrorist attack, or such an attack has already been set but not yet effectuated, and we don’t know it yet. Instead, a well‐designed cyberattack has the capacity cause widespread chaos, sow societal unrest, undermine national governments, spread paralyzing fear and anxiety, and create a state of utter turmoil, all without taking a single life. A sophisticated cyberattack could throw a nation’s banking and finance system into chaos causing markets to crash, prompting runs on banks, degrading confidence in markets, perhaps even putting the nation’s currency in play and making the government look helpless and hapless. In today’s difficult economy, imagine how Americans would react if vast sums of money were taken from their accounts and their supporting financial records were destroyed. A truly nefarious cyberattacker could carry out an attack in such a way (akin to Robin Hood) as to engender populist support and deepen rifts within our society, thereby making efforts to restore the system all the more difficult. A modestly advanced enemy could use a cyberattack to shut down (if not physically damage) one or more regional power grids. An entire region could be cast into total darkness, power‐dependent systems could be shutdown. An attack on one or more regional power grids could also cause cascading effects that could jeopardize our entire national grid. When word leaks that the blackout was caused by a cyberattack, the specter of a foreign enemy capable of sending the entire nation into darkness would only increase the fear, turmoil and unrest. While the finance and energy sectors are considered prime targets for a cyberattack, an attack on any of the 17 delineated critical infrastructure sectors could have a major impact on the United States. For example, our healthcare system is already technologically driven and the Obama Administration’s e‐health efforts will only increase that dependency. A cyberattack on the U.S. e‐health infrastructure could send our healthcare system into chaos and put countless of lives at risk. Imagine if emergency room physicians and surgeons were suddenly no longer able to access vital patient information. A cyberattack on our nation’s water systems could likewise cause widespread disruption. An attack on the control systems for one or more dams could put entire communities at risk of being inundated, and could create ripple effects across the water, agriculture, and energy sectors. Similar water control system attacks could be used to at least temporarily deny water to otherwise arid regions, impacting everything from the quality of life in these areas to agriculture. In 2007, the U.S. Cyber Consequences Unit determined that the destruction from a single wave of cyberattacks on critical infrastructures could exceed $700 billion, which would be the rough equivalent of 50 Katrina‐esque hurricanes hitting the United States all at the same time.29 Similarly, one IT security source has estimated that the impact of a single day cyberwar attack that focused on and disrupted U.S. credit and debit card transactions would be approximately $35 billion.30 Another way to gauge the potential for harm is in comparison to other similar noncyberattack infrastructure failures. For example, the August 2003 regional power grid blackout is estimated to have cost the U.S. economy up to $10 billion, or roughly .1 percent of the nation’s GDP. 31 That said, a cyberattack of the exact same magnitude would most certainly have a much larger impact. The origin of the 2003 blackout was almost immediately disclosed as an atypical system failure having nothing to do with terrorism. This made the event both less threatening and likely a single time occurrence. Had it been disclosed that the event was the result of an attack that could readily be repeated the impacts would likely have grown substantially, if not exponentially. Additionally, a cyberattack could also be used to disrupt our nation’s defenses or distract our national leaders in advance of a more traditional conventional or strategic attack. Many military leaders actually believe that such a disruptive cyber pre‐offensive is the most effective use of offensive cyber capabilities. This is, in fact, the way Russia utilized cyberattackers—whether government assets, governmentdirected/ coordinated assets, or allied cyber irregulars—in advance of the invasion of Georgia. Widespread distributed denial of service (DDOS) attacks were launched on the Georgian governments IT systems. Roughly a day later Russian armor rolled into Georgian territory. The cyberattacks were used to prepare the battlefield; they denied the Georgian government a critical communications tool isolating it from its citizens and degrading its command and control capabilities precisely at the time of attack. In this way, these attacks were the functional equivalent of conventional air and/or missile strikes on a nation’s communications infrastructure.32 One interesting element of the Georgian cyberattacks has been generally overlooked: On July 20th, weeks before the August cyberattack, the website of Georgian President Mikheil Saakashvili was overwhelmed by a more narrowly focused, but technologically similar DDOS attack.33 This should be particularly chilling to American national security experts as our systems undergo the same sorts of focused, probing attacks on a constant basis. The ability of an enemy to use a cyberattack to counter our offensive capabilities or soften our defenses for a wider offensive against the United States is much more than mere speculation. In fact, in Iraq it is already happening. Iraq insurgents are now using off‐the‐shelf software (costing just $26) to hack U.S. drones (costing $4.5 million each), allowing them to intercept the video feed from these drones.34 By hacking these drones the insurgents have succeeded in greatly reducing one of our most valuable sources of real‐time intelligence and situational awareness. If our enemies in Iraq are capable of such an effective cyberattack against one of our more sophisticated systems, consider what a more technologically advanced enemy could do. At the strategic level, in 2008, as the United States Central Command was leading wars in both Iraq and Afghanistan, a cyber intruder compromised the security of the Command and sat within its IT systems, monitoring everything the Command was doing. 35 This time the attacker simply gathered vast amounts of intelligence. However, it is clear that the attacker could have used this access to wage cyberwar—altering information, disrupting the flow of information, destroying information, taking down systems—against the United States forces already at war. Similarly, during 2003 as the United States prepared for and began the War in Iraq, the IT networks of the Department of Defense were hacked 294 times.36 By August of 2004, with America at war, these ongoing attacks compelled then‐Deputy Secretary of Defense Paul Wolfowitz to write in a memo that, "Recent exploits have reduced operational capabilities on our networks."37 This wasn’t the first time that our national security IT infrastructure was penetrated immediately in advance of a U.S. military option.38 In February of 1998 the Solar Sunrise attacks systematically compromised a series of Department of Defense networks. What is often overlooked is that these attacks occurred during the ramp up period ahead of potential military action against Iraq. The attackers were able to obtain vast amounts of sensitive information—information that would have certainly been of value to an enemy’s military leaders. There is no way to prove that these actions were purposefully launched with the specific intent to distract American military assets or degrade our capabilities. However, such ambiguities—the inability to specifically attribute actions and motives to actors—are the very nature of cyberspace. Perhaps, these repeated patterns of behavior were mere coincidence, or perhaps they weren’t. The potential that an enemy might use a cyberattack to soften physical defenses, increase the gravity of harms from kinetic attacks, or both, significantly increases the potential harms from a cyberattack. Consider the gravity of the threat and risk if an enemy, rightly or wrongly, believed that it could use a cyberattack to degrade our strategic weapons capabilities. Such an enemy might be convinced that it could win a war—conventional or even nuclear—against the United States. The effect of this would be to undermine **our** deterrence‐based defenses, making us significantly more at risk of a major war.

#### Independently, hydrogen economy solves nuclear war

Julian **Gresser and** James A. **Cusumano**, March/April **2005**. Chairman of Alliances for Discovery org), a nonprofit organization dedicated to accelerating breakthrough discoveries and founder and retired chairman of Catalytica Inc., former research director for Exxon, and currently vice chairman of the World Business Academy. “Hydrogen and the New Energy Economy,” The Futurist, Ebsco.

Today, oil supplies 40% of the world’s energy needs and 90% of its transportation requirements. Global economic growth over the next 15 years will increase petroleum’s share of energy generation to 60%, most of this demanded by the transportation sector when the number of cars increases from 700 million to 1.25 bil- lion. The annual economic growth rate of rapidly industrializing nations such as China (10%) and India (7%) will greatly intensify the pressure, while at the same time proven reserves will continue to be drawn down at four times the rate of new discoveries. If the world were constant and only the demand for oil increased— without the concomitant decrease in production that we project—a signif- icant rise in the price of oil could be managed solely as an energy supply problem as it was in the 1980s. But the world has become far riskier and uncertain, and the coming sharp spikes in the price of oil could have severe impacts. For one thing, the world’s financial, economic, energy, environmental, and other systems have become increasingly integrated. If the integrity or robustness of any of these systems is significantly compromised, the stresses may well be rapidly transferred to other systems, leading to global chaos. A sharp rise in the price of oil will also fall most heavily on the most impoverished countries and the poorest people in industrialized soci- eties, substantially increasing their suffering. Systems based on suffer- ing of this magnitude eventually become unstable. The systemic chaos ensuing from this predicted oil crisis could pose psychological trauma because throughout most of human history the rate of change has proceeded in a linear, if not entirely orderly, way. Today in virtually every sector of the industrialized world, the rate of change is becoming exponential. We are poorly adapted psychologically and emotionally for this shift and will be prone to panic in times of crisis. **Such panic could quickly escalate to catastrophe, with weapons of mass destruction now widely avail- able, inexpensively produced, and easily deployed**. That possibility is all the more threatening as the num- ber of terrorist groups actively seek- ing to acquire these weapons and to cause havoc, murder, and mayhem multiplies. When tightly coupled systems become as stressed as they currently are, and when these stresses do not abate, but rather compound as now seems likely, there is a tendency for these systems to reach a tipping point—when a single event, though not catastrophic in itself, has the potential to unleash a cascade of disorder and turbulence. Most policy makers overlook the oil-price tipping point because they do not appear to understand—from a systems perspective—the linkage of oil prices to other destabilizing trends. Currently, more than 20% of the world’s oil is in the hands of nations known to sponsor terrorism, and are under sanctions by the United States and/or the United Nations. As a re- sult, oil-producing nations in the Middle East will gain an influence on world affairs previously unthink- able by energy and political strate- gists. These nations will continue to increase their arms, leading to greater instability in that region and worldwide. Massive wealth will flow to terrorist organizations as the free world indirectly rewards their sponsors through the purchase of oil at increasingly higher prices. Fixed supplies, stalled discoveries, and sharply increased consumption will drive prices in the near future to an oil-price tipping point. The wisest way to anticipate and mitigate this risk would be to implement an immediate “quantum jump” into energy conservation and hydrogen development. This will help us avoid, or at least minimize, the dislocations of the oil-price tip- ping point, while achieving an orderly and smooth transition to a Hydrogen Economy in later stages of the program. To be sure, even this quantum jump strategy will likely require 15 to 20 years to achieve broad displacement of current oil sources by hydrogen.

#### OTEC sequesters carbon – that’s necessary to solve climate change

Christopher **Barry**, **2008**. Naval architect and co-chair of the Society of Naval Architects and Marine Engineers ad hoc panel on ocean renewable energy. “Ocean Thermal Energy Conversion and CO2 Sequestration,” renewenergy.wordpress.com/2008/07/01/ocean-thermal-energy-conversion-and-co2-sequestration/.

However, deep cold water is laden with nutrients. In the tropics, the warm surface waters are lighter than the cold water and act as a cap to keep the nutrients in the deeps. This is why there is much less life in the tropical ocean than in coastal waters or near the poles. The tropical ocean is only fertile where there is an upwelling of cold water. One such upwelling is off the coast of Peru, where the Peru (or Humboldt) Current brings up nutrient laden waters. In this area, with lots of solar energy and nutrients, ocean fertility is about 1800 grams of carbon uptake per square meter per year, compared to only 100 grams typically. This creates a rich fishery, but most of the carbon eventually sinks to the deeps in the form of waste products and dead microorganisms. This process is nothing new; worldwide marine microorganisms currently sequester about forty billion metric tonnes of carbon per year. They are the major long term sink for carbon dioxide. In a recent issue of Nature, [Lovelock and Rapley](http://blogs.nature.com/climatefeedback/2007/09/lovelock_and_rapley_propose_cu_1.html) suggested using wave-powered pumps to bring up water from the deeps to sequester carbon. But OTEC also brings up prodigious amounts of deep water and can do the same thing. In one design, a thousand cubic meters of water per second are required to produce 70 MW of net output power. We can make estimates of fertility enhancement and sequestration, but a guess is that an OTEC plant designed to optimize nutrification might produce 10,000 metric tonnes of carbon dioxide sequestration per year per MW. The recent challenge by billionaire Sir Richard Branson is to sequester one billion tonnes of carbon dioxide per year in order to halt global warming, so an aggressive OTEC program, hundreds of several hundred MW plants might meet this.

#### Warming is real and anthropogenic – carbon dioxide increase, polar ice records, melting glaciers, sea level rise

**Prothero 12** [Donald R. Prothero, Professor of Geology at Occidental College and Lecturer in Geobiology at the California Institute of Technology, 3-1-2012, "How We Know Global Warming is Real and Human Caused," Skeptic, vol 17 no 2, EBSCO]

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Converging Lines of Evidence¶ How do we know that global warming is real and primarily human caused? There are numerous lines of evidence that converge toward this conclusion.¶ 1. Carbon Dioxide Increase.¶ Carbon dioxide in our atmosphere has increased at an unprecedented rate in the past 200 years. Not one data set collected over a long enough span of time shows otherwise. Mann et al. (1999) compiled the past 900 years' worth of temperature data from tree rings, ice cores, corals, and direct measurements in the past few centuries, and the sudden increase of temperature of the past century stands out like a sore thumb. This famous graph is now known as the "hockey stick" because it is long and straight through most of its length, then bends sharply upward at the end like the blade of a hockey stick. Other graphs show that climate was very stable within a narrow range of variation through the past 1000, 2000, or even 10,000 years since the end of the last Ice Age. There were minor warming events during the Climatic Optimum about 7000 years ago, the Medieval Warm Period, and the slight cooling of the Little Ice Age in die 1700s and 1800s. But the magnitude and rapidity of the warming represented by the last 200 years is simply unmatched in all of human history. More revealing, die timing of this warming coincides with the Industrial Revolution, when humans first began massive deforestation and released carbon dioxide into the atmosphere by burning an unprecedented amount of coal, gas, and oil.¶ 2. Melting Polar Ice Caps.¶ The polar icecaps are thinning and breaking up at an alarming rate. In 2000, my former graduate advisor Malcolm McKenna was one of the first humans to fly over the North Pole in summer time and see no ice, just open water. The Arctic ice cap has been frozen solid for at least the past 3 million years (and maybe longer),4 but now the entire ice sheet is breaking up so fast that by 2030 (and possibly sooner) less than half of the Arctic will be ice covered in the summer.5 As one can see from watching the news, this is an ecological disaster for everything that lives up there, from the polar bears to the seals and walruses to the animals they feed upon, to the 4 million people whose world is melting beneath their feet. The Antarctic is thawing even faster. In February-March 2002, the Larsen B ice shelf - over 3000 square km (the size of Rhode Island) and 220 m (700 feet) thick- broke up in just a few months, a story typical of nearly all the ice shelves in Antarctica. The Larsen B shelf had survived all the previous ice ages and interglacial warming episodes over the past 3 million years, and even the warmest periods of the last 10,000 years- yet it and nearly all the other thick ice sheets on the Arctic, Greenland, and Antarctic are vanishing at a rate never before seen in geologic history.¶ 3. Melting Glaciers.¶ Glaciers are all retreating at the highest rates ever documented. Many of those glaciers, along with snow melt, especially in the Himalayas, Andes, Alps, and Sierras, provide most of the freshwater that the populations below the mountains depend upon - yet this fresh water supply is vanishing. Just think about the percentage of world's population in southern Asia (especially India) that depend on Himalayan snowmelt for their fresh water. The implications are staggering. The permafrost that once remained solidly frozen even in the summer has now Üiawed, damaging the Inuit villages on the Arctic coast and threatening all our pipelines to die North Slope of Alaska. This is catastrophic not only for life on the permafrost, but as it thaws, the permafrost releases huge amounts of greenhouse gases which are one of the major contributors to global warming. Not only is the ice vanishing, but we have seen record heat waves over and over again, killing thousands of people, as each year joins the list of the hottest years on record. (2010 just topped that list as the hottest year, surpassing the previous record in 2009, and we shall know about 2011 soon enough). Natural animal and plant populations are being devastated all over the globe as their environments change.6 Many animals respond by moving their ranges to formerly cold climates, so now places that once did not have to worry about disease-bearing mosquitoes are infested as the climate warms and allows them to breed further north.¶ 4. Sea Level Rise.¶ All that melted ice eventually ends up in the ocean, causing sea levels to rise, as it has many times in the geologic past. At present, the sea level is rising about 3-4 mm per year, more than ten times the rate of 0.10.2 mm/year that has occurred over the past 3000 years. Geological data show Üiat ttie sea level was virtually unchanged over the past 10,000 years since the present interglacial began. A few mm here or there doesn't impress people, until you consider that the rate is accelerating and that most scientists predict sea levels will rise 80-130 cm in just the next century. A sea level rise of 1.3 m (almost 4 feet) would drown many of the world's low-elevation cities, such as Venice and New Orleans, and low-lying countries such as the Netherlands or Bangladesh. A number of tiny island nations such as Vanuatu and the Maldives, which barely poke out above the ocean now, are already vanishing beneath the waves. Eventually their entire population will have to move someplace else.7 Even a small sea level rise might not drown all these areas, but they are much more vulnerable to the large waves of a storm surge (as happened with Hurricane Katrina), which could do much more damage than sea level rise alone. If sea level rose by 6 m (20 feet), most of die world's coastal plains and low-lying areas (such as the Louisiana bayous, Florida, and most of the world's river deltas) would be drowned.¶ Most of the world's population lives in lowelevation coastal cities such as New York, Boston, Philadelphia, Baltimore, Washington, D.C., Miami, and Shanghai. All of those cities would be partially or completely under water with such a sea level rise. If all the glacial ice caps melted completely (as they have several times before during past greenhouse episodes in the geologic past), sea level would rise by 65 m (215 feet)! The entire Mississippi Valley would flood, so you could dock an ocean liner in Cairo, Illinois. Such a sea level rise would drown nearly every coastal region under hundreds of feet of water, and inundate New York City, London and Paris. All that would remain would be the tall landmarks such as the Empire State Building, Big Ben, and the Eiffel Tower. You could tie your boats to these pinnacles, but the rest of these drowned cities would lie deep underwater.

#### Worst-case warming results in extinction

Ahmed 2010 (Nafeez Ahmed, Executive Director of the Institute for Policy Research and Development, professor of International Relations and globalization at Brunel University and the University of Sussex, Spring/Summer 2010, “Globalizing Insecurity: The Convergence of Interdependent Ecological, Energy, and Economic Crises,” Spotlight on Security, Volume 5, Issue 2, online)

Perhaps the most notorious indicator is anthropogenic global warmings warming. The landmark 2007 Fourth Assessment Report of the UN Intergovernmental Panel on Climate Change (IPCC) – which warned that at then-current rates of increase of fossil fuel emissions, the earth’s global average temperature would likely rise by 6°C by the end of the 21st century creating a largely uninhabitable planet – was a wake-up call to the international community.[v] Despite the pretensions of ‘climate sceptics,’ the peer-reviewed scientific literature has continued to produce evidence that the IPCC’s original scenarios were wrong – not because they were too alarmist, but on the contrary, because they were far too conservative. According to a paper in the Proceedings of the National Academy of Sciences, current CO2 emissions are worse than all six scenarios contemplated by the IPCC. This implies that the IPCC’s worst-case six-degree scenario severely underestimates the most probable climate trajectory under current rates of emissions.[vi] It is often presumed that a 2°C rise in global average temperatures under an atmospheric concentration of greenhouse gasses at 400 parts per million (ppm) constitutes a safe upper limit – beyond which further global warming could trigger rapid and abrupt climate changes that, in turn, could tip the whole earth climate system into a process of irreversible, runaway warming.[vii] Unfortunately, we are already well past this limit, with the level of greenhouse gasses as of mid-2005 constituting 445 ppm.[viii] Worse still, cutting-edge scientific data suggests that the safe upper limit is in fact far lower. James Hansen, director of the NASA Goddard Institute for Space Studies, argues that the absolute upper limit for CO2 emissions is 350 ppm: “If the present overshoot of this target CO2 is not brief, there is a possibility of seeding irreversible catastrophic effects.”[ix] A wealth of scientific studies has attempted to explore the role of positive-feedback mechanisms between different climate sub-systems, the operation of which could intensify the warming process. Emissions beyond 350 ppm over decades are likely to lead to the total loss of Arctic sea-ice in the summer triggering magnified absorption of sun radiation, accelerating warming; the melting of Arctic permafrost triggering massive methane injections into the atmosphere, accelerating warming; the loss of half the Amazon rainforest triggering the momentous release of billions of tonnes of stored carbon, accelerating warming; and increased microbial activity in the earth’s soil leading to further huge releases of stored carbon, accelerating warming; to name just a few. Each of these feedback sub-systems alone is sufficient by itself to lead to irreversible, catastrophic effects that could tip the whole earth climate system over the edge.[x] Recent studies now estimate that the continuation of business-as-usual would lead to global warming of three to four degrees Celsius before 2060 with multiple irreversible, catastrophic impacts; and six, even as high as eight, degrees by the end of the century – a situation endangering the survival of all life on earth.[xi]

#### Warming causes extinction – oceans

**Sify 2010 –** Sydney newspaper citing Ove Hoegh-Guldberg, professor at University of Queensland and Director of the Global Change Institute, and John Bruno, associate professor of Marine Science at UNC (Sify News, “Could unbridled climate changes lead to human extinction?”, <http://www.sify.com/news/could-unbridled-climate-changes-lead-to-human-extinction-news-international-kgtrOhdaahc.html>, WEA)

The findings of the comprehensive report: 'The impact of climate change on the world's marine ecosystems' emerged from a synthesis of recent research on the world's oceans, carried out by two of the world's leading marine scientists. One of the authors of the report is Ove Hoegh-Guldberg, professor at The University of Queensland and the director of its Global Change Institute (GCI). 'We may see sudden, unexpected changes that have serious ramifications for the overall well-being of humans, including the capacity of the planet to support people. This is further evidence that we are well on the way to the next great extinction event,' says Hoegh-Guldberg. 'The findings have enormous implications for mankind, particularly if the trend continues. The earth's ocean, which produces half of the oxygen we breathe and absorbs 30 per cent of human-generated carbon dioxide, is equivalent to its heart and lungs. This study shows worrying signs of ill-health. It's as if the earth has been smoking two packs of cigarettes a day!,' he added. 'We are entering a period in which the ocean services upon which humanity depends are undergoing massive change and in some cases beginning to fail', he added. The 'fundamental and comprehensive' changes to marine life identified in the report include rapidly warming and acidifying oceans, changes in water circulation and expansion of dead zones within the ocean depths. These are driving major changes in marine ecosystems: less abundant coral reefs, sea grasses and mangroves (important fish nurseries); fewer, smaller fish; a breakdown in food chains; changes in the distribution of marine life; and more frequent diseases and pests among marine organisms. Study co-author John F Bruno, associate professor in marine science at The University of North Carolina, says greenhouse gas emissions are modifying many physical and geochemical aspects of the planet's oceans, in ways 'unprecedented in nearly a million years'. 'This is causing fundamental and comprehensive changes to the way marine ecosystems function,' Bruno warned, according to a GCI release. These findings were published in Science

### 1ac plan

#### Plan: The National Oceanic and Atmospheric Administration should substantially reduce restrictions on Ocean Thermal Energy Conversion in the United States imposed by entites other than the National Oceanic and Atmospheric Administration.

### 1ac solvency

**Solvency:**

#### Current patchwork of restrictions prevents commercial viability—removing it is key to solve

**Griset 2010** (Todd, J.D. from the University of Pennsylvania, advises utilities going before state and federal regulating agencies, "Harnessing the Ocean's Power: Opportunities in Renewable Ocean Energy Resources", Ocean and Coastal Law Journal, Vol. 16:2)

Whether renewable ocean energy development will occur in U.S. ¶ waters on a commercial scale remains to be seen. The potential ¶ environmental impact of individual units remains largely unknown, let ¶ alone the impacts of build-out and development on a larger scale.¶ 226¶ The slate of technologies available for extracting usable energy from the sea ¶ is promising, but most—and particularly those with the greatest ¶ potential—remain in an immature state. As interest in refining these ¶ technologies continues, mechanisms for converting the oceans’ energy ¶ into usable power are improving in efficiency and cost-effectiveness. ¶ Regulatory regimes applicable to renewable ocean energy continue to ¶ evolve as well. For example, the decision of the Massachusetts DPU to ¶ approve Cape Wind’s power purchase agreement with National Grid, and ¶ the FERC order approving the concept of a multi-tiered avoided cost rate ¶ structure under which states may establish a higher avoided cost rate for ¶ mandated renewable power, both represent an evolution in the traditional ¶ regulation of public utilities. In both cases, regulatory policy has shifted ¶ to favor renewable energy production even though it may initially bear a ¶ higher cost than production from fossil fuel-based resources. These ¶ shifts may continue to bring renewable ocean energy closer to costcompetitiveness or cost-parity with traditional resources. Time will tell ¶ whether the trend toward greater ocean energy development will rise and ¶ fall like the tides, as has the trends responsible for the initial enactment ¶ of the OTEC Act, subsequent removal of NOAA’s regulations, and the ¶ current resurgence of interest in OTEC, or whether these shifts represent ¶ definite progress toward a new form of energy production. ¶ Furthermore, clarification and simplification of the patchwork of ¶ regulatory regimes governing renewable ocean energy projects will bring ¶ about additional reductions in the cost of energy from the sea. As a ¶ general principle, uncertainty or inconsistency of regulation tends to ¶ deter development and investment.¶ 227¶ Unknown or shifting regulatory ¶ regimes add risk to the development of any given project.¶ 228¶ Indeed, in ¶ the context of ocean energy, regulatory uncertainty has been called “the ¶ most significant non-technical obstacle to deployment of this new ¶ technology.”¶ 229¶ Consistent government commitment and the ¶ simplification of licensing and permitting procedures, rank among the hallmarks of a well-planned system for developing ocean renewable ¶ energy.¶ 230¶ Arguably, such a system has not yet been fully realized. Some ¶ observers believe that the MOU between MMS and FERC has “resolved ¶ the uncertainty” over the jurisdictional question, and by extension, over ¶ the question of which set of regulations a developer of a project on the ¶ OCS must follow.¶ 231¶ On the other hand, the dual process created by the ¶ MOU under which MMS/BOEMRE must first approve a site and issue a ¶ lease, after which FERC may issue a license or exemption, may lead to ¶ delays in the development of hydrokinetic energy resources on the ¶ OCS.¶ 232¶ Nevertheless, the agencies have committed themselves to ¶ cooperate and have issued guidance suggesting that where possible, the ¶ agencies will combine their National Environmental Policy Act ¶ processes.¶ 233¶ At the same time, technologies such as OTEC remain under the ¶ jurisdiction of NOAA. As noted above, a host of other federal agencies ¶ retain authority to regulate various aspects of renewable ocean energy ¶ projects. The nation’s regulatory program for ocean energy projects thus ¶ lacks a single “one-stop shop” approach for project licensure, site ¶ leasing, and other required permitting. Project developers must not only ¶ obtain permits from a variety of federal and state entities, but moreover ¶ face uncertainty as to which permits may be required. The net impact of ¶ this regulatory patchwork is to place a chilling effect on the ¶ comprehensive development of the nation’s renewable ocean energy ¶ resources. ¶ Moreover, few renewable ocean energy projects have been fully ¶ permitted. Indeed, the Cape Wind project represents the first ¶ commercial-scale offshore wind project to complete its permitting and ¶ licensing path.¶ 234¶ Although each future project’s details and regulatory path may be unique, the success of the first United States offshore wind ¶ project to go through the public regulatory process provides subsequent ¶ developers with valuable insight into challenges, procedures, and ¶ provides an understanding of how to apportion permitting and ¶ development costs with greater certainty.¶ 235¶ However, because that path ¶ took nine years to navigate, and because many of the regulatory shifts ¶ described herein occurred during that time, project developers today will ¶ face a different regulatory structure than that faced by Cape Wind. ¶ Moreover, depending on the technology involved, site-specific issues, ¶ and the regulatory environment of each state, each project must in ¶ essence forge its own path forward toward complete regulatory approval. ¶ Congressional action could further streamline the regulatory ¶ framework applicable to renewable ocean energy projects. Providing a ¶ stable structure for the development of the oceans’ renewable energy ¶ potential would reduce the capital cost required to develop a given ¶ project. By providing a clear and consistent legal path for project ¶ developers to follow, such legislation would enable the best ocean ¶ energy projects to become more cost-competitive. This in turn could ¶ provide benefits along the lines of those cited by the Massachusetts ¶ Department of Public Utilities in approving the Cape Wind power ¶ purchase agreement: economic development, a diversified energy policy, ¶ greater energy independence, and reduced carbon emissions. The states’ ¶ role in such a regulatory framework should be respected. While ¶ renewable power benefits the region, the nation, and the world at large, ¶ most of the negative impacts of a given project are felt locally. ¶ Establishing a clear regulatory framework including appropriate federal ¶ agencies as well as state authority could empower greater development ¶ of ocean energy resources without sacrificing values such as navigational ¶ rights, fisheries and wildlife, aesthetic considerations, and states’ rights. ¶ Our oceans hold vast promise. The opportunity to transform that ¶ potential into usable energy is significant. Whether developing that ¶ potential into commercial-scale energy production is a reasonable choice ¶ remains to be seen. If renewable ocean energy resources are to be ¶ developed, promoting regulatory certainty would do much to promote ¶ their cost-effective development.

#### Overlapping restriction of OTEC collapses the industry—both state and federal agencies can claim jurisdiction, preventing a viable industry from developing

**Elefant 2002** (Carolyn, Principle Attorney at LOCE, November 19, " Proposed Strategies for Addressing Regulatory Uncertainty in Ocean Energy Development in the United States ", http://www.energypulse.net/centers/article/article\_display.cfm?a\_id=79)

The Regulatory Barriers To Ocean Energy Developers - Overview of Regulatory Uncertainty: The foregoing events suggest that presently, there is sufficient confidence in the functionality of ocean energy technology to warrant further investigation of its potential for commercialization. However, even if these pilot projects and investigative programs resolve all of the feasibility and economic concerns about ocean energy, one substantial barrier to commercialization of ocean energy would still remain: regulatory uncertainty. Regulatory uncertainty refers to those risks inherent in the obtaining any necessary licenses or permits to construct and operate the project from the appropriate regulatory authority. Risks exist in the regulatory process because both federal and state licensing or permitting authorities typically have the option of rejecting a permit application or alternatively, issuing a permit but including limits on operation or required enhancement measures to mitigate environmental impacts which can increase the overall cost of the project. In deciding whether to fund an energy project, investors must factor in the risks associated with licensing a project and will decline investment where there is considerable uncertainty that a project can or will be licensed on favorable terms. Indeed, regulatory uncertainty explains why nuclear power plants have long been regarded as an unappealing investment: given strong public opposition and stringent licensing requirements, the chances of a nuclear project obtaining a license which does not include onerous operating and mitigating conditions are slim. Why Ocean Energy Projects Carry Regulatory Uncertainty: For a variety of reasons, ocean energy projects carry with them a higher degree of regulatory uncertainty than conventional energy projects. These reasons include: Overlapping or unknown jurisdictional issues and requirements Most conventional energy projects such as fossil fuel, natural gas and even wind farms are subject to well established state siting and/or zoning laws applied by state regulatory bodies while development of most hydro power plants has been regulated by the Federal Energy Regulatory Commission ( FERC) for the past seventy five years. By contrast, it is unclear which regulatory agencies will have primary jurisdiction over ocean energy projects (with the exception of OTEC projects which are regulated by NOAA, pursuant to the OTEC Act). Consider the following myriad of possibilities: \* Projects which will be sited up to three miles from shore are technically on state lands per the Submerged Lands Act which vests states with control and title over those lands. 43 U.S.C. sec. 1301(a)(2). Arguably then, states would have primary regulatory jurisdiction through state power plant siting and coastal development statutes At the same time, even for projects located on state lands, federal interests in navigation are implicated and as a result, even projects regulated by the state would likely still require various permits from the Army Corps of Engineers. \* To throw another wrench into the equation, the Federal Energy Regulatory Commission has jurisdiction over hydro power projects located on navigable and commerce clause waterways. 16 U.S.C. sec. 817. Several statutes define navigable waters as including waters within the three mile limit from shore while ocean projects could be classified as hydro power since they utilize water to generate electricity. Thus, FERC is another possible candidate for permitting or licensing ocean projects and indeed, has issued preliminary permits to study wave power projects. See Passamadquoddy Tribal Council, 11 FERC para. 62,236 (1980)(permit for tidal project near Cobscook Bay); Quantum Energy orders supra. \* For projects beyond the three mile limit from shore, i.e., on the Outer Continental Shelf, the Corps of Engineers retains permitting authority under Section 10 of the Rivers and Harbors Act, as extended by Section 4(d) of the Outer Continental Shelf Lands Act (OCSLA), 43 U.S.C.A. sec 1331-56. Indeed, as discussed earlier, the Corps is currently processing a permit for an offshore windfarm located five miles off the coast of Cape Cod, Massachusetts. However, the Secretary of Interior, through the Mineral Management Service (MMS) has long had administered the oil and gas leasing and production program on the Outer Continental Shelf and arguably, has more expertise over ocean based energy projects than the Corps of Engineers. Variety in Types of Ocean Energy Projects In contrast to conventional technologies which can fall into more definite categories, e.g., coal, gas, hydro, there are a huge variety of projects which fall roughly within the rubric of ocean energy. These include OTEC, tidal power, wave energy systems employing pneumatic devices such as the Wells turbine; current energy which might employ slow moving turbines designed to operate in low head rivers and even offshore wave projects or hybrid wind-wave projects. The location of an ocean energy project - i.e., at shoreline, within three miles from shore or beyond three miles, depends upon the technology employed and thus, it might be impossible for one regulatory body to have jurisdiction over all ocean projects based on the existing parameters just discussed. • Lack of Information as to Regulatory Standards Even after resolving which agency has regulatory responsibility over ocean energy projects, another unknown is what types of regulatory standards these agencies will apply to evaluate ocean energy projects? These agencies may decide that existing permitting regulations (which may either apply a broad public interest standard or establish specific criteria for reviewing environmental impacts, economic feasibility, etc...) suffice to evaluate ocean energy projects. Or the agencies may determine that ocean energy development, with an unproven track record, unknown impacts and questionable permanence (e.g., how long will the projects last in a harsh ocean environment?) could require additional regulations which would require more extensive studies on environmental impacts or the implementation of a decommissioning plan. Why Regulatory Uncertainty, if Left Unresolved, Will Present Problems: The problem of regulatory uncertainty, if left unresolved, will stand as a major impediment to ocean energy development and commercialization for the reasons listed below: \* Questions about which agency has authority to license ocean energy projects can contribute to turf wars amongst agencies and lead to a duplicative and confusing application process where a developer must submit several permit applications and possibly be subject to competing conditions for operation and mitigating impacts. Overlap between agencies thus leads to increased development costs and delay. \* Opponents of ocean energy projects can use regulatory uncertainty to their advantage to oppose a project by arguing that a particular regulatory agency lacks jurisdiction over the project. Jurisdictional questions can be taken all the way to the courts which could agree with project opponents and conclude that an agency lacked jurisdiction, thereby rendering the entire permit process a waste.

#### NOAA can do the plan – authority overall OTEC laws and licensing

Carolyn **Elefant**, CEO and legislative director of the Ocean Renewable Energy Coalition, no date, “Regulation of Offshore Renewables Development -Existing Regulatory Regime and Proposals for Improvement,” [http://www.his.com/~israel/loce/naspresent.pdf](http://www.his.com/%7Eisrael/loce/naspresent.pdf)

OTEC Act, 42 U.S.C. § 9111 - gives NOAA jurisdiction to license OTEC projects: No person shall engage in the ownership, construction or operation of an OTEC facility...[located in waters of the United States] except with a license issued by NOAA. A) OTEC Act was intended to create one stop shopping for licensing of OTEC plants. NOAA promulgated regulations governing applications for OTEC licenses (15 C.F.R. Part 981) but withdrew them in 1996 due to lack of OTEC applicants. B) To obtain an OTEC license, applicants must comply with applicable federal and state laws (See Summary Chart for more details). For example, OTEC applicant will need to get a Section 10 permit from Corps of Engineers because plant may pose an obstruction to navigation. But NOAA regulations provide for Consolidated Application Review (CAR) to coordinate timing and processing of multiple permit applications. C) OTEC regulations allow exemption for demo projects qualified by Department of Energy and non-permanent test platforms D) Standard for issuance of license: project is in national interest and complies with applicable laws.

#### OTEC is feasible, economically viable, and recent advancements solve all problems

**McCallister and McLaughlin 2012** [Captain Michael, Senior Engineer with Sound and Sea Technology, Commander Steve, Critical Infrastructure Programs Manager at Sound and Sea Technology, January, "Renewable Energy from the Ocean", U.S. Naval Institute Proceedings, Vol. 138, Issue 1, EBSCO]

The well-known OTEC operating principles date to the original concept proposed by Jacques-Arsène d'Arsonval in 1881. OTEC recovers solar energy using a thermodynamic cycle that operates across the temperature difference between warm surface water and cold deep water. In the tropics, surface waters are above 80 degrees Fahrenheit, while at depths of about 1,000 meters water temperatures are just above freezing. This grathent provides a differential that can be used to transfer energy from the warm surface waters and generate electricity.¶ For a system operating between 85 and 35 degrees Fahrenheit, the temperature differential yields a maximum thermodynamic Carnot cycle efficiency of 9.2 percent. Although this is considered low efficiency for a power plant, the "fuel" is free. Hence, the real challenge is to build commercial-scale plants that yield competitively priced electricity.¶ Overcoming Barriers¶ Previous attempts to develop a viable and practical OTEC commercial power system suffered from several challenges. The low temperature delta requires large seawater flows to yield utility scale outputs. Therefore, OTEC plants must be large. Thus, they will also be capital-intensive. As plant capacity increases, the unit outlay becomes more cost-effective due to economy of scale.¶ Survivable cold-water pipes, cost-efficient heat exchangers, and to a lesser extent offshore structures and deep-water moorings represent key technical challenges. However, developments in offshore technologies, new materials, and fabrication and construction processes that were not available when the first serious experimental platforms were developed in the 1970s now provide solutions. When located close to shore, an OTEC plant can transmit power directly to the local grid via undersea cable. Plants farther from shore can also produce power in the form of energy carriers like hydrogen or ammonia, which can be used both as fuel for transportation and to generate power ashore. In agricultural markets, reasonably priced, renewablebased ammonia can displace natural gas in fertilizer production.¶ Combined with marine algae aquaculture programs, OTEC plants can also produce carbon-based synthetic fuels. OTEC facilities can be configured to produce fresh water, and, from a military perspective, system platforms can also serve as supply bases and surveillance sites.¶ Facing Reality¶ Availability of relatively "cheap" fossil fuels limits societal incentives to change and makes energy markets difficult to penetrate. However, the realization of "peak oil" (the theoretical upper limit of global oil production based on known reserves), ongoing instability in Middle East political conditions, adversarial oil-supply partners, and concerns over greenhouse-gas buildup and global warming all contribute to the need for renewable energy solutions.¶ An assessment of OTEC technical readiness by experts at a 2009 National Oceanic and Atmospheric Administration workshop indicated that a 10 megawatt (MW) floating OTEC facility is technically feasible today, using current design, manufacturing, and installation technologies.¶ While readiness and scalability for a 100 MW facility were less clear, the conclusion was that experience gained during the construction, deployment, and operation of a smaller pilot plant would be a necessary step in OTEC commercialization.

## 2ac

### Heg

**Heg solves china war**

Thayer, 6 [Bradley A., Assistant Professor of Political Science at the University of Minnesota, Duluth, The National Interest, November -December, “In Defense of Primacy”, lexis]

They are the "Gang of Five": China, Cuba, Iran, North Korea and Venezuela. Of course, countries like India, for example, do not agree with all policy choices made by the United States, such as toward Iran, but New Delhi is friendly to Washington. Only the "Gang of Five" may be expected to consistently resist the agenda and actions of the United States. China is clearly the most important of these states because it is a rising great power. But even Beijing is intimidated by the United States and refrains from openly challenging U.S. power. China proclaims that it will, if necessary, resort to other mechanisms of challenging the United States, including asymmetric strategies such as targeting communication and intelligence satellites upon which the United States depends. **But China may not be confident those strategies would work**, and so it is likely to refrain from testing the United States directly for the foreseeable future because China's power benefits, as we shall see, from the international order U.S. primacy creates.

**Withdrawal causes nuclear conflicts – the US would be forced to re-intervene**

**Lieber 2005** – Professor of Government and International Affairs at Georgetown University [Robert J., The American Era: Power and Strategy for the 21st Century, p. 53-54]

Withdrawal from foreign commitments might seem to be a means of evading hostility toward the United States, but the consequences would almost certainly be harmful both to regional stability and to U.S. national interests. Although Europe would almost certainly not see the return to competitive balancing among regional powers (i.e., competition and even military rivalry between France and Germany) of the kind that some realist scholars of international relations have predicted," elsewhere the dangers could increase. In Asia, Japan, South Korea, and Taiwan would have strong motivation to acquire nuclear weapons – which they have the technological capacity to do quite quickly. Instability and regional competition could also escalate, not only between India and Pakistan, but also in Southeast Asia involving Vietnam, Thailand, Indonesia, and possibly the Philippines. Risks in the Middle East would be likely to increase, with regional competition among the major countries of the Gulf region (Iran, Saudi Arabia, and Iraq) as well as Egypt, Syria, and Israel. Major regional wars, eventually involving the use of weapons of mass destruction plus human suffering on a vast scale, floods of refugees, economic disruption, and risks to oil supplies are all readily conceivable. Based on past experience, the United States would almost certainly be **drawn back into** these areas, whether to defend friendly states, to cope with a humanitarian catastrophe, or to prevent a hostile power from dominating an entire region. Steven Peter Rosen has thus fit-tingly observed, "If the logic of American empire is unappealing, it is not at all clear that the alternatives are that much more attractive."2z Similarly, Niall Ferguson has added that those who dislike American predominance ought to bear in mind that the alternative may not be a world of competing great powers, but one with no hegemon at all. Ferguson's warning may be hyperbolic, but it hints at the perils that the absence of a dominant power, "apolarity," could bring "an anarchic new Dark Age of waning empires and religious fanaticism; of endemic plunder and pillage in the world's forgotten regions; of economic stagnation and civilization's retreat into a few fortified enclaves."2

#### Heg sovle Russian expansionism and Russo-Ukraine war

**Brezinski 12** ( Zbigniew Kazimierz Brzezinski is a Polish American political scientist, geostrategist, and statesman who served as United States National Security Advisor to President Jimmy Carter from 1977 to 1981. Jan/ Feb, “8 Geopolitically Endangered Species,” http://www.foreignpolicy.com/articles/2012/01/03/8\_geopolitically\_endangered\_species?page=0,7)

Kiev's relationship with Moscow has been as prone to tension as its relationship with the West has been prone to indecision. In 2005, 2007, and 2009, Russia either threatened to or did stop oil and natural gas from flowing to Ukraine. More recently, President Viktor Yanukovych was pressured to extend Russia's lease of a naval base at the Ukrainian Black Sea port of Sevastopol for another 25 years in exchange for preferential pricing of Russian energy deliveries to Ukraine. The Kremlin continues to press Ukraine to join a "common economic space" with Russia, while gradually stripping Ukraine of direct control over its major industrial assets through mergers and takeovers by Russian firms. With America in decline, Europe would be less willing and able to reach out and incorporate Ukraine into an expanding Western community, leaving Ukraine more vulnerable to Russian designs. At stake: The renewal of Russian imperial ambitions.

#### Concedes heg is key to solve great power war

**Monteiro 11** \*Nuno P. Monteiro is Assistant Professor of Political Science at Yale University [<http://www.mitpressjournals.org/doi/pdf/10.1162/ISEC_a_00064>, “Unrest Assured: Why Unipolarity is not Peaceful”]

In addition, Wohlforth claims that wars among major powers are unlikely, because the unipole will prevent conflict from erupting among important states. He writes, “The sole pole’s power advantages matter only to the degree that it is engaged, and it is most likely to be engaged in politics among the other major powers. 44 **I agree** that if the unipole were to pursue a strategy of defensive dominance, major power wars would be unlikely. Yet, there is no compelling reason to expect that it will always follow such a course. Should the unipole decide to disengage, as Wohlforth implies, **major power wars would be possible**

### Topicality – Restrictions 2AC

#### A restri ction is a regulatory constraint

**Farlex, ’12** (Farlex collection, Princeton University, 2012, WordNet 3.0, Print)//CC

restriction - an act of limiting or restricting (as by regulation)

#### In the context of OTEC, these regulatory barriers are restrictions – patent law

**Shapiro et all 12** [Patent application title: Industrial Ocean Thermal Energy Conversion Processes¶ Inventors: Laurence Jay Shapiro (Fair Lawn, NJ, US) Barry R. Cole (Mineral, VA, US) Jonathan M. Ross (Arnold, MD, US), Russ Krull (Centreville, VA, US), ¶ Assignees: The Abell Foundation, Inc., ¶ IPC8 Class: AF03G704FI, ¶ USPC Class: 606417, ¶ Class name: Utilizing natural heat with natural temperature differential ocean thermal energy conversion (otec), ¶ Publication date: 2012-03-29, ¶ Patent application number: 20120073291, ¶ Patent Docs]

Embodiments have been described wherein a portion of the cold water from an OTEC system are diverted for use in a separate power generation system, such as in a steam condenser. The cold water from the OTEC system can also be diverted to cool various warm water discharges from other power generation systems or industrial processing systems. Many shore based power generation and industrial processing facilities face regulatory restrictions in how hot various cooling water systems can discharge into the environment. For example, cooling water discharged from a nuclear power plant or a coal fired power plant cannot reenter a water reservoir, river, lake or the ocean greater than 25 degrees Fahrenheit over the natural ambient conditions. This avoids the formation of a thermal plume or other thermal pollution. In aspects of the present invention the large volume of OTEC cooling water can be completely or partially diverted to combine with the warm water discharge of a power generation facility or other industrial processing facility to lower that warm water discharge to within regulatory compliance. In aspects of the invention, the combination of cold water discharge from an OTEC cycle with other warm water discharge can bring the combined water discharge close to ambient temperatures, thereby eliminating the formation of a thermal plume and greatly reducing thermal pollution.

**their interpretation would mean no topical affs for a shitload of other energy – the only requirements for oil and fossil fuels are the leasing requirements which are also a question of regulation because there is no cap and it’s legal.**

**Institute for Energy Research in 12** (Fossil fuel production on federal lands at 9 year low; <http://www.instituteforenergyresearch.org/2012/03/15/fossil-fuel-production-on-federal-lands-at-9-year-low/>)

**The Energy Information Administration** (EIA) just released its **report**, Sales of Fossil Fuels Produced on Federal and Indian Lands, FY 2003 Through FY 2011.[i] This report **shows** that total fossil fuel **production on federal lands is falling**, **natural gas** production on federal lands is falling, **and oil** production on federal land fell in 2011 ending two years of increase. Specifically the new EIA report shows: Fossil fuel (coal, oil, and natural gas) production on Federal and Indian lands is the lowest in the 9 years EIA reports data and is 6 percent less than in fiscal year 2010. **Crude oil and lease condensate production on Federal and Indian lands is 13 percent lower than in fiscal year 2010**. Natural gas production on Federal and Indian lands is the lowest in the 9 years that EIA reports data and is 10 percent lower than in fiscal year 2010. Natural gas plant liquids production on Federal and Indian lands is 3 percent lower than in fiscal year 2010. Coal production on Federal and Indian lands is the lowest in the 9 years of data that EIA reported and is 2 percent lower than in fiscal year 2010. Crude oil production on Federal and Indian lands decreased 13 percent from 739 million barrels in fiscal year 2010 to 646 million barrels in fiscal year 2011. Production of crude oil on Federal lands is dominated by offshore production, which fell by 17 percent in fiscal year 2011, mostly notably due to government actions taken following the oil spill in the Gulf of Mexico in 2010. These actions include a moratorium on offshore drilling by the Obama Administration, followed by a permit moratorium. **Only recently has the Obama Administration leased any federal land offshore to oil and gas drilling**.

#### Net benefits

#### 1. Aff innovation – Their interpretation disincentivizes nuanced use of topic restriction literature to support narrow definitions – those skills outweigh limits

**Stockton College 82** Richard Stockton College of New Jersey, Mission Statement, http://intraweb.stockton.edu/eyos/page.cfm?siteID=124&pageID=36

At Stockton we seek to help our students develop the capacity for continuous learning and the ability to adapt to changing circumstances in a multicultural and interdependent world by insisting on breadth, as well as depth, in our curriculum. We believe that the breadth inherent in an interdisciplinary approach to liberal education both prepares students for inevitable career changes, and enriches their lives. We insist on excellence in teaching and dedication to learning. These, indeed, are the guiding principles of our mission. Moreover, we recognized a responsibility not only to transmit received ideas to our students but to participate in the development of new ideas. Accordingly, we encourage continuous research, learning, and professional development for our faculty and staff. Quality academic programs are best created, developed, and maintained by a high degree of faculty and student responsibility for, and participation in, the educational process. For that reason, the College is committed to faculty-wide involvement in general education and in teaching such academic skills as writing, quantitative analysis, and logical reasoning. Breadth, then, is not only a desirable outcome for our students, but a requisite for the faculty who teach these students. To teach beyond the traditional bounds of one’s area of formal expertise, across disciplinary lines, and to interrelate the traditional disciplines, requires and extraordinary effort from faculty. It is imperative that the executive administration and the trustees provide the resources and the atmosphere, which will make such exceptional effort both possible and appreciated. Our insistence upon breadth of education for all students does not preclude an emphasis on depth of study in the major disciplines but rather, supplements it. Our academic programs must offer students a real understanding of the ideas and methods of their disciplines, including those most recently developed. Exposure to many disciplines and intensive investigation of one discipline should prepare graduates to move into appropriate fields of employment, or to continue with graduate academic or professional study. At Stockton we believe that co-curricular activities complement the academic curriculum and, along with classroom education, help students develop the capacity for making intelligent choices. While we offer students assistance in and out of the classroom, we emphasize and encourage student initiative in their co-curricular life, and responsibility for their education. We value diversity and the differing perspectives it brings. Accordingly, we are unequivocally committed to implementing the principles of affirmative action in the composition of our student body, faculty, and staff. Just as students must receive an education that is sufficiently broad to permit flexible response to changes in society, so too the College must be able to change and adapt to differing circumstances and needs in our society. In order to best fulfill our mission, we must all recognize the limitations of our resources, and respond by a prudent and flexible allocation of those resources.

#### 2. Arbitrariness – their interpretation has no conceptual basis – impact is rational decision-making

Martin Borowski (Faculty at Birmingham Law School, Vice-President of the British Section of the International Association for Philosophy of Law and Social Philosophy) 2003 “Religious Freedom as a Fundamental Human Right, a Rawlsian Perspective” in Pluralism and Law, Conference Proceedings” p. 58

Despite the problems that arise In distinguishing restrictions and regulations, noted above, one might introduce different criteria to justify both types of diminutions. One can distinguish formal and material criteria of justification. Rawls does not mention any formal criterion. Materially, a regulation has to respect the central range of applicationu of a basic liberty. But this applies to restrictions, too, and cannot give rise to any difference. Every diminution of a basic right or freedom, whether or not it is based on the content or the modality of a citizen’s action, is a restriction and, as such, has to be justified. The distinction between restrictions and regulations is expendable.

#### Limits explosion inevitable – restrictions are broader than regulations

Bernard Hoekman and Petros C. Mavroidis (World Bank Development Research Group) October 2002 “Economic Development, Competition Policy, and the World Trade Organization” http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2002/11/22/000094946\_02111404425138/Rendered/PDF/multi0page.pdf

Under the "effects" doctrine (or subjective territoriality), countries may take action¶ against foreign practices that have negative effects in their markets. Cartels are an¶ example. The WTO may be relevant in this connection through GATT Art. XI, which¶ states: "no prohibition or restriction ... shall be instituted or maintained ... on the exportation or sale for export". Export cartels are a restriction on exportation. As with national treatment, the threshold issue is whether the export cartel can be attributed to government behavior. On this, a GATT panel (Japan - Semiconductors) argued that a "but for" test should be used, i.e., to what extent the observed behavior would have taken place absent government involvement. Unfortunately the precise degree of government involvement was not specified and thus it is doubtful whether mere 'tolerance' of a cartel suffices. Arguably, however, even passive behavior could be caught by Art. XI, given that the term "restriction" invites a wider reading than the terms "law", "regulation" or "requirement" figuring in Art. I1.4. A legislative (rule making) initiative could usefully clarify this gray area.

### Topicality – Production/Solar 2AC

#### OTEC is the production of solar power – it uses the oceans as a thermal storage system, like a battery

**Makai 10** [Nov 12, 2010, “OTEC - Ocean Thermal Energy Conversion”, Makai Ocean Engineering was founded in 1973 as a diversified ocean engineering company providing services in Hawaii and the Pacific]

OTEC is in many ways a very attractive solution to US energy issues (Energy Security, Price Volatility, Unsustainable Supply, Climate Change, and Environmental Risks): Immense Resource: OTEC is solar power, using the oceans as a thermal storage system for 24-hour production. Unlike other renewable energies, the maximum available energy from OTEC is not limited by land, shorelines, water, environmental impact, human impact, etc.

#### Solar energy is thermal or photovoltaic

**New Jersey Clean Energy 12** [“Why Solar”, last updated nov 2012]

Solar energy refers to electric or thermal energy produced from the light or heat of the sun. There are several types of solar technologies; however, this section focuses only on photovoltaic (PV for short) systems, which convert sunlight into electricity.

#### Aff innovation – Their interpretation excludes solar panels and creates a stagnant and hazy interpretation of energy production

**Batelle 80** [Batelle (the world’s largest nonprofit research and development organization, specializing in global science and technology) 1980 “An Analysis of Federal Incentives Used to Stimulate Energy Production” p 22 <http://www.scribd.com/doc/67538352/Federal-Incentives-for-Energy-Production-1980>]

Discussing governmental actions in a field that lacks consistent Policy is difficult, since boundaries defining energy actions are unclear. All governmental actions probably have at least some indirect relevance to energy. if a consistent Policy did exist, the discussion could focus on those actions that are part of the planned and consistent program. For this analysis, however, boundaries must be somewhat arbitrarily defined. First, this discussion will include only those actions taken by the Federal Government; relevant actions of state and local governments are not considered. Second, the discussion covers only those Federal Government actions In which major causes include to influence energy or major effects included some Influence on energy. Within those limits, the discussion considers actions related to both production arid consumption, although production receives the most emphasis. It also includes actions relating to both increases and decreases in energy consumption or production. Energy production is defined as the transformation of natural resources into commonly used forms of energy such as heat, light, and electricity. By this definition, the shining of the sun or the running of a river are not examples of energy production, but the installation of solar panels or the construction of a hydroelectric dam are. Energy consumption is defined is the use of one of these common, manufactured forms of energy. Under this definition sunbathing Is not energy consumption, but heating water by means of a solar panel is In both definitions, the crucial ingredient is the application of technology and resources to change a natural resource into a useful energy form.

#### 3. OTEC education good – solves extinction

**Downs 6** [“OTEC AND OTEC MARICULTURE OFFSHORE A PERSONAL AND TECHNICAL VIEW”, By Tim Downs, founder of the Communication Center, last updated 11/26/2006]

This article was to have been a simple description work I carried out for the Hawaii Natural Energy Institute during 1988-90. However, I would like to begin with a personal view of why I believe work in OTEC is important.¶ At the root of all our future science and engineering into natural resources there should lie a motivation to understand them first and then use them sensibly .¶ Growing up in Britain, one is very aware of its industrial heritage. The poet Wordsworth wrote glowingly about the pioneers of industrial science and technology:¶ ..... those to whom the harmonious doors ¶ Of Science have unbarred celestial stores,¶ To whom a burning energy has given ¶ That other eye which darts thro 'Earth and Heaven.¶ ' An Evening Walk' (1788-9)¶ Later, he became disillusioned about the spirit of his 'Inventive Age' with it's 'new and unforeseen creation'. Sensitive to the monumental changes he observed, he wrote of 'unremitting fires' and the permanent curtain of smoke they disgorged.¶ Fundamental to the environmental problems of resource exploitation is the way that human beings view their place in the natural world. The relationship between human beings and Nature has logically been governed by utility. Reaching an extreme state, this motivation is characterized by swift and ignorant consumption that is inherently fallacious in its benefit.¶ It is true that human beings can change neither the laws of cultural evolution nor those of organic evolution. However , we can understand these laws, act with recognition of them, and thereby influence their outcome for the better. This approach of 'enlightened self-interest' is exemplified in the work on OTEC systems. I was struck from this outset by the implications of this form of energy production-its local and, more significantly, its global potential.¶ I suspect that the scientists and engineers who believe in OTEC, share my hope that we are entering a new era-one that reflects our precarious relationship with natural resources, and uses it as motivation for assuming the true responsibility of knowledge:¶ an active conscience. By coming to terms with Life as a continuum, we can compromise with Nature to ensure its survival and therefore our own.

### Courts

#### Perm – do both

Perine 8 (Katherine, Staff – CQ Politics, “Congress Unlikely to Try to Counter Supreme Court Detainee Ruling”, 6-12, http://www.cqpolitics.com/wmspage.cfm?docID=news-000002896528&cpage=2)

Thursday’s decision, from a Supreme Court dominated by Republican appointees, gives Democrats further cover against GOP sniping. “This is something that the court has decided, and very often the court gives political cover to Congress,” said Ross K. Baker, a Rutgers Universitiy political science professor. “You can simply point to a Supreme Court decision and say, ‘The devil made me do it.’ ”

#### Saying “Federal Government” doesn’t mean “all three branches” – any one body acts as it

Chicago 7 (University of Chicago Manual of Style, “Capitalization, Titles”, http://www.chicagomanualofstyle.org/CMS\_FAQ/CapitalizationTitles/CapitalizationTitles30.html)

Q. When I refer to the government of the United States in text, should it be U.S. Federal Government or U.S. federal government? A. The government of the United States is not a single official entity. Nor is it when it is referred to as the federal government or the U.S. government or the U.S. federal government. It’s just a government, which, like those in all countries, has some official bodies that act and operate in the name of government: the Congress, the Senate, the Department of State, etc.

#### Reduce means to diminish the strength of

OED 89 (Oxford English Dictionary, “Reduce,” Volume 13, p. 433)

21. e. to diminish the strength of (spirit).

#### Unconstitutional laws are eliminated

Treanor and Sperling 93 (William, Associate Professor of Law – Fordham University, and Gene, Deputy Assistant to the President for Economic Policy, “Prospective Overruling And The Revival Of "Unconstitutional" Statutes”, Columbia Law Review, December, 93 Colum. L. Rev. 1902 , Lexis)

An unconstitutional act is not a law for any purpose, cannot confer any right, cannot be relied upon as a manifestation of legislative intent, and, "is, in legal contemplation, as inoperative as though it had never been passed." [Norton v. Shelby County, 118 U.S. 425, 442, 6 S.Ct. 1121, 30 L.Ed. 178 (1886);](http://www.lexis.com/research/buttonTFLink?_m=da9d7379cbfcf0c93db5d1432c4d149a&_xfercite=%3ccite%20cc%3d%22USA%22%3e%3c%21%5bCDATA%5b93%20Colum.%20L.%20Rev.%201902%5d%5d%3e%3c%2fcite%3e&_butType=3&_butStat=2&_butNum=63&_butInline=1&_butinfo=%3ccite%20cc%3d%22USA%22%3e%3c%21%5bCDATA%5b118%20U.S.%20425%2cat%20442%5d%5d%3e%3c%2fcite%3e&_fmtstr=FULL&docnum=2&_startdoc=1&wchp=dGLzVlz-zSkAz&_md5=6e05c2517504e7f8821fc4f5a63f477b) [Chicago, Ind. & L. Ry. Co. v. Hackett, 228 U.S. 559, 566-67, 33 S.Ct. 581, 57 L.Ed. 966 (1913).](http://www.lexis.com/research/buttonTFLink?_m=da9d7379cbfcf0c93db5d1432c4d149a&_xfercite=%3ccite%20cc%3d%22USA%22%3e%3c%21%5bCDATA%5b93%20Colum.%20L.%20Rev.%201902%5d%5d%3e%3c%2fcite%3e&_butType=3&_butStat=2&_butNum=64&_butInline=1&_butinfo=%3ccite%20cc%3d%22USA%22%3e%3c%21%5bCDATA%5b228%20U.S.%20559%2cat%20566%5d%5d%3e%3c%2fcite%3e&_fmtstr=FULL&docnum=2&_startdoc=1&wchp=dGLzVlz-zSkAz&_md5=d0c00f0cb7331c7a562787591dd27dff) Because of this principle, legislative bodies often fail to repeal unconstitutional statutes, deeming them obsolete matter which can be later deleted in the course of a general revision or recodification of the laws on the particular subject. [61](http://www.lexis.com/research/retrieve?_m=69d72af7f6c2f11adca9366cc91715a9&docnum=2&_fmtstr=FULL&_startdoc=1&wchp=dGLzVlz-zSkAz&_md5=545bbccdfb5337dc4b23e7bd320ab13f&focBudTerms=nonrevival&focBudSel=all#n61)

Neese 5 (Angela – Candidate for Juris Doctor, University of Colorado School of Law, 2005; B.S.B.A., University of Denver, “THE BATTLE BETWEEN THE COLORADO OIL AND GAS CONSERVATION COMMISSION AND LOCAL GOVERNMENTS: A CALL FOR A NEW AND COMPREHENSIVE APPROACH”, 2005, 76 U. Colo. L. Rev. 561, lexis)

These two leading Colorado Supreme Court decisions, Bowen/Edwards and Voss, were decided over a decade ago, and yet these cases "leave many questions unanswered." n185 For example, the court did not adequately define "operational conflict," n186 and "it left to speculation the type of local regulation which will offend the principles articulated in those cases." n187 What these Colorado Supreme Court decisions did, in effect, was create a regime in which each occurrence of stringent local regulation of the oil and gas industry must be examined by the courts on a case-by-case basis. Because the court held that state preemption of local regulation is not total, "each provision of a local oil and gas regulation must be examined to determine whether it presents a conflict." n188 For the past decade, the Colorado Supreme Court has declined to hear any further cases on the issue of state preemption of local government oil and gas regulation, thereby foreclosing any possibility of providing more direct guidelines for the COGCC and local governments. As a result, this case-by-case system of preemption analysis has led to more than a decade worth of costly litigation, with no end in sight. The case-by-case regime leads to a high degree of unpredictability and puts natural gas developers and local governments constantly at odds. n189 The litigation that often results, when the industry and the local governments are forced to look to the courts to determine which regulations are controlling, is costly to the industry (and thus to natural gas consumers) and to local governments (and thus to the taxpayers). n190 The lack of predictability, the high costs of litigation, and the resulting delays in production are proof that the Colorado Supreme Court has done the state a disservice by not providing a workable framework on the issue of state preemption of oil and gas regulation. n191 Bowen/Edwards is considered the determinative case as to preemption, yet both sides cite this case in their briefs and point to the same language as suggestive that they will prevail. n192 The lack of clear guidelines under the current Colorado [\*585] case law results in a number of unanswered questions that will likely lead to future legal battles.

#### No solvency: delay

Klein 84 (Mitchell S. G., MA and Ph.D in Political Science – Northwestern University, Law, Courts, and Policy, p. 117-118)

The aphorism “Justice delayed is justice denied” finds support from nay court analysts. Court delay is a significant administrative problem in the judiciary. As H. Ted Rubin observes: “Far too many courts operate essentially in the same fashion as fifty years ago … Too many judges have failed to effectively administer control of their own court calendar.” (1976, p. 185) A number of problems associated with court delay have been noted by Hans Zeisel and associates (1959, pp. xxii-xxiii). For example, delay in the courtroom jeopardizes justice because evidence may deteriorate over time. It also causes severe hardship to some parties, even depriving some of a basic public service. Finally, court delay also produces an unhealthy emphasis on the desirability of settling out of court.

#### OTEC is critical to develop sea colonies

Marshall **Savage**, **1992**. Professor of English at USC. “The Millennial Project: Colonizing the Galaxy in Eight Easy Steps,” p. 33-34.

The pulsing heart of Aquarius is an OTEC (Ocean Thermal Energy Converter). The OTEC produces electrical power by exploiting the temperature differential between warm surface waters and cold deep waters. Aquarius has a long tap root that penetrates to the cold deep waters of the sea. By taking in warm water from the surface and sucking up cold water from the depths, OTECs generate electrical power. Most power generating facilities conform to the zero-sum rules. They consume more energy than they produce. A typical nuclear power plant consumes 3000 calories of energy for every 1000 it produces. This is not unlike the thermodynamics of a cow who consumes three pounds of grain for every pound of milk she produces. Unlike conventional power plants, OTECs are net energy producers. An OTEC consumes only 700 calories of energy for every 1000 it produces. This is a characteristic that OTECs share with most solar powered devices, including green plants. The OTEC consumes no fuel, so the only energy the system requires is that needed to construct and operate it. By virtue of its ability to absorb solar energy, and to use that energy to impose higher states of order on the materials in its environment, the OTEC, like a living plant, is able to operate in defiance of the second law of thermodynamics. Of course, the law is not violated in the broader universe, since the sun is providing the energy, and it is running down, just as the law demands. But it will be a long time before we have to include the fusion engine of the sun in our calculations of local entropy. For the time being, we can consider sunlight as a free good, outside the limits of our earth¬bound system of energy accounting. The anti-entropic nature of OTECs is what distinguishes Aquarius as a new cybergenic life form. Like a plant, Aquarius will grow organically from a seed by feeding directly on sunlight; It Will create itself out of the raw amorphous materials in its environment; and, it will produce an abundance of precious resources out of little more than sunlight and sea water. In a broad sense, therefore, Aquarius can be considered a life form-a macro-organism, a super-plant. Guided by on-board computer intelligence, Aquarius will grow its own structure out of the sea. This will be accomplished by a process akin to that used by shellfish. Building materials will be amassed by accreting minerals dissolved in sea water. Sheltered and nurtured like the cells in a silicate sponge, thousands of people can live comfortably in this organic structure. In the process of producing power, the OTECs pump vast quantities of cold water up from the depths. This. deep :vater. is saturated with nitrogen and other nutrients. When this nutrient-rich water hits the warm sunlit surface, algae populations explode. The algae are cultivated in broad shallow containment ponds that spread out around the central island of Aquarius like the leaves of a water lily. The algae soak in the tropical sun, absorbing the rich nutrient broth from the depths and producing millions of tons of protein. Aquarius will be the first of the new cybergenic life forms, but by no means the last. Once we have grown ten thousand of these colonial super-organisms, we will culture and harvest enough protein-rich algae to **feed every hungry human on Earth**. We will generate enough electrical power-converted into clean-burning hydrogen-to completely replace all fossil fuels. We will build enough living space to house hundreds of millions of people in self-sufficient, pollution-free, comfort.We will learn the harsh lessons of space colonization in the mellow school of a tropical paradise.

#### Sea colonization independently solves all extinction threats

**Savage 92** (Marshall, Professor of English at USC. “The Millennial Project: Colonizing the Galaxy in Eight Easy Steps,” p. 94-95.)

Every space colony is an ark. Aquarius will serve not only as the jumping off point for the colonization of space, but also as a reserve ark for the potential recolonization of Earth. Life must be preserved; we, the caretakers of Life, must survive to preserve it. Our planet is threatened by a variety of calamities. Some are developing as slowly as an eroding atmosphere; others could come as suddenly as a nuclear blast. In any case, if catastrophe does overtake us, there must be some seed of surviving human culture from which to rebuild civilization. Without man, or some other intelligent tool user, Life will be condemned to remain bound to this single tiny planet-perhaps forever. If Life is to survive then we too must survive. Aquarius can fulfill the role of planetary ark admirably. Sheltered in the warm equatorial waters, our floating marine colony can survive almost any conceivable disaster, including nuclear war. The warm waters of the tropical oceans will give up only a fraction of their heat even if the rest of the planet is plunged into nuclear winter for months. Similarly, the catastrophic climatic effects of nuclear winter that will ravage the mid-latitudes with colossal hurricanes, typhoons, and tornadoes, will leave the stable equatorial belt more or less unaffected. Aquarius is self-sufficient in energy, food, and most other things. While the rest of humanity attempts to cope with a shattered world: unable to raise crops, perhaps for years; ravaged by social and political anarchy; decimated by plagues, pestilence, floods and droughts; and slowly poisoned by radiation in the food chain; the people of Aquarius will be relatively unharmed. The social dissolution following nuclear war is likely to be as destructive to life and civilization as the war itself. No trace of social order is likely to survive in the countries actually blasted by the bombs. Massive upheavals will shred the already tattered social fabric even in countries left unmolested. By the time radiation, starvation, riots, poverty and disease have reaped their grim harvest, there will be only isolated pockets of survivors clinging to life here and there around the world. At that point, it will be up to the scientists, technicians, artists, poets, and philosophers of Aquarius-just as in the legends of Atlantis-to recolonize this planet.

### China

#### No impact to the Chinese economy and the response measures check

Coonan 08 (10/25, Clifford, IrishTimes.com, “China's stalling boom has globe worried,” http://www.irishtimes.com/newspaper/opinion/2008/1025/1224838827729.html)

All of this downbeat news feeds into a growing suspicion that China has had its cake and eaten for way too long, and that there is simply no precedent for a country growing and growing without some kind of respite. Establishing what that pause will look like and what it means to the rest of the world is the latest challenge facing global analysts. A hangover is considered inevitable and the Olympics, while meaningless economically, are widely considered the psychological trigger for China to face a slowdown. Despite all this gloom, however, writing China off is premature. The Beijing government is well placed to help protect the economy from the worst ravages of a global downturn. It has spent the last two years trying to fight inflation and cool the overheating economy, so it's a lot easier for it to take the foot off the brakes than it is to put them on in the first place. The central bank has lowered its benchmark interest rate twice in the past two months, the first time in six years. The State Council is increasing spending on infrastructure, offering tax rebates for exporters and allowing state-controlled prices for agricultural products to rise. Expect significant measures to kick-start the property market to avoid house prices falling too drastically. China has a lot of plus points to help out. Chinese banks did not issue subprime loans as a rule, and the country's €1.43 trillion in hard-currency reserves is a useful war chest to call on in a downturn*.* The currency is stable and there are high liquidity levels, all of which give China the most flexibility in the world to fend off the impact of the global financial crisis, says JP Morgan economist Frank Gong. China is now a globalised economy, but its domestic market is still massively underexploited, and it is to this market that the government will most likely turn. While it is a globalised economy committed to the WTO, China is also a centralised economy run by the Communist Party, and it has no real political opposition at home to stop it acting however it sees fit to stop sliding growth. Should the economy start to worsen significantly, public anger will increase, but China has been so successful in keeping a tight leash on the internet and the media that it is difficult for opposition to organise itself in a meaningful way. Recent years of surging growth in China have certainly done a lot to keep global economic data looking rosy, but perhaps China's influence has been somewhat oversold*.* It is not a big enough economy by itself to keep the global economy ticking over, accounting for 5 per cent of the world economy, compared to the United States with a muscular 28 per cent. And whatever about slowing growth, 9 per cent is still an admirable rate, one that European leaders gathered this weekend in Beijing for the Asian-Europe Meeting would give their eye teeth to be able to present to their constituencies.

#### CCP resilient—the economy won’t shake it

**Blackwill 2009** – former US ambassador to India and US National Security Council Deputy for Iraq, former dean of the Kennedy School of Government at Harvard (Robert D., RAND, “The Geopolitical Consequences of the World Economic Recession—A Caution”, http://www.rand.org/pubs/occasional\_papers/2009/RAND\_OP275.pdf, WEA)

Next, China. Again, five years from today. Did the recession undermine the grip of the Chinese Communist Party on the People’s Republic of China (PRC)? No. Again, as Lee Kuan Yew stressed in the same recent speech, “China has proven itself to be pragmatic, resilient and adaptive. The Chinese have survived severe crises—the Great Leap Forward and the Cultural Revolution—few societies have been so stricken. These are reasons not to be pessimistic.” Did the crisis make Washington more willing to succumb to the rise of Chinese power because of PRC holdings of U.S. Treasury Bonds? No. Did it alter China’s basic external direction and especially its efforts, stemming from its own strategic analysis, to undermine the U.S. alliance system in Asia? No. Did it cause the essence of Asian security to transform? No.

#### Catastrophic consequences to CCP collapse are just fear-mongering – instability is key to ensure democracy and won’t cause chaos

Bruce Gilley, 2004. PhD Candidate Politics @ Princeton U. and Adjunct Prof. Int’l. Affairs @ New School U. “China's Democratic Future: How it Will Happen and where it Will Lead,” p. 115-116, Google Print.

Would the entire PRC edifice simply collapse from the accumulated pressures of crisis and mass protest? In cross-countn' comparisons, "post-totalitarian" states like China are the most vulnerable to collapse because they are unable to respond creatively to protest and yet there is no organized opposition to assume control.' The East German regime was a perfect example. It simply collapsed when huge defections front the state occurred at fltl) level and there was no organized opposition ready to take over. In the C.cnnan case, there was a neighboring fraternal state whose arms provided some cushion for the collapse. China would not have the same support. For this reason, the CCP and many of its supporters have warned of the dangers of collapse in words designed to scare the regime's opponents into quiescence. Fear-mongering about the consequences of regime collapse in China has been a staple of PRC propaganda since reforms began. Deng said: if the political situation in China became unstable the trouble would spread to the rest of the world, with consequences that would be hard to imagine 7' Foreign scholars have taken up the histrionics with relish. One has worried about societal disintegration" and even "the fragmentation of China into several competing polities." Another warns: At worst the resulting chaos from a collapsing China would have a profound effect on the stability of Asia and on the US. policy to guarantee the security of its Asian allies, At the least, China could turn to the West for economic relief and reconstruction, the price tag of which would be overwhelming. Yet these fears appear overblown or misplaced. First, as we saw in the last pad, many of these dire descriptions are an accurate portrayal of China today. The problems of Party rule have created the very crisis that the fear-mongers allude to. China already has an AIDs crisis, an illegal emigration crisis, a pollution crisis, and an economic crisis. Given it’s well-established state and social cohesion, China has far more to gain than to lose from political liberalization. Second, there is a good argument that governance in China will not collapse further even with a top leadership in crisis. The country actually functioned quite normally during the Cultural Revolution, when there was often no rule at the top, as a result of strong local governments and a social fabric that held together. At this stage, with popular protests in full swing, a military on good behavior and a regime trying to confront the possibility of change, there is no reason to believe that the country will abruptly disintegrate. As in 1989. it, fact, there is even' reason to believe that people will act better toward each other and that local governments will look kindly upon the movement, an outpouring of civic behavior linked to the ideals of democracy. Finally, as above, if we are concerned with the creation of a more just system, then **some degree of chaos**" relating to unstable government **may be a worthwhile** price to pay, including **for the world.** Claims by some U.S. foreign policy analysts that "there is as great a 'threat' to US interests from a weak and unstable China as there is from a strong and antagonistic China" are based on a highly instrumental and even then flawed view of U.S., and world, interests. A world community committed to the principles of justice through democracy has an overriding interest in its realization in China. To the extent that instability in China worsens conditions for greater justice there or abroad, it would indeed "threaten" world interests. But if the instability, despite its costs, leads to greater gains through a more just order in China and, through it, abroad, then this is very much in the world's interest. Few Americans, French, Croats, Romanians, South Africans, Filipinos, South Koreans, or Indonesians would say the "chaos" of their democratic revolutions was not a price worth paying. China's people should be allowed to make the same choice. However, an alarmist view of growing popular mobilization against an authoritarian regime has too often landed the US. in particular on the wrong side of a democratic movement. During a visit to South Korea in 1986, then U.S. Secretary of State George Shultz voiced support for the military regime's rejection of opposition demands for a direct presidential election, calling such an arrangement "unusual" A year later, the regime conceded to the demands, The US., now portrayed as an enemy of democracy in South Korea, found its consulates and embasss the subject of popular protest A better policy from both normative and instrumental points of view, then, would be to call for a peaceful resolution of the protests and to lean on the Party to heed the voice of the people. This might require some quiet coalition building in the region to backstop the instability and fall-out. But again, from both normative and instrumental points of view, this is in the long-term in- terests of the world community. China will not collapse, even in the face of metastatic crisis and popular mobilization, But it will certainly face grave instability. The best policy for the world community in responding to this instability will be to ensure that the democratic breakthrough occurs as quickly as possible.

#### They can’t win offense – the transition will be stable

Bruce Gilley, January 2007. Assistant professor of political studies at Queen's University in Canada, and former contributing editor at the Far Eastern Economic Review. “Is China Stuck?” Journal of Democracy, 18.1, Project Muse.

Yet what if the CCP is actually quite responsive? What if it is in tune with popular demands, and finds ways to move and adapt as those demands change? In other words, what if the party stays or goes because of [End Page 173] popular pressures? Pei himself recognizes this possibility. He cites "rising public dissatisfaction" (p.14) as one thing that would prod the regime to change. "A democratic opening may emerge in the end, but not as a regime-initiated strategy undertaken at its own choosing, but more likely as the result of a sudden crisis" (p. 44). Perhaps the word crisis is being used in two different senses here. One crisis and another can, after all, vary in urgency: There are crises and there are crises. The crisis of which Pei speaks seems to be of the more benign sort, a mere shift in public preferences that prods the regime to change. Such a crisis will not require democracy to rise upon the ashes of a razed public square, but rather will stir the regime to recognize that its time has come, and to do the right thing by going fairly gentle into that good night. If so, then the prospects for a relatively smooth democratic transition in China are bright and no collapse is likely.

#### CCP instability is key to Chinese democratization --- pressure will trigger limited democratic reforms --- these will snowball into full democracy

Arthur Waldron, Spring 2004. Senior Fellow of Foreign Policy Research Institute and the Lauder Professor of International Relations at the University of Pennsylvania. “Democratization and Greater China: How Would Democracy Change China?” Orbis, [www.fpri.org/orbis/4802/waldron.democracychangechina.pdf](http://www.fpri.org/orbis/4802/waldron.democracychangechina.pdf))

More surprisingly, Hu has at least paid lip service to democracy for the citizenry as well. On the eve of National Day, October 1, he made a speech that asserted: ‘‘We must enrich the forms of democracy, make democratic procedures complete, expand citizens’ orderly political participation and ensure that the people can exercise democratic elections, democratic decision making, democratic administration, and democratic scrutiny.’’18 Why is Hu saying this? Other Chinese have been forthright in their demands that their country adopt what journalists still often refer to as Western-style democracy—even though Japan, India, South Korea, Taiwan, the Philippines, and other Asian states have democratic lineages in many cases far longer than many of the West’s ‘‘new democracies.’’ Thus, on the eve of a Party meeting called for mid-October to discuss amending the constitution, the respected Beijing constitutional scholar and economist Cao Siyuan published China’s Constitution Revision—Protect Everyone’s Legal Rights, which he sent to every member of the Politburo. In it he advocates immediate steps to discard Marxist rhetoric, give priority to citizens’ rights, and enforce the presumption of innocence in court proceedings. He urges holding direct elections at all levels, empowering local and provincial legislatures, privatizing the media, and guaranteeing freedom of speech, press, and religion.19 The immediate official response to these suggestions was to place Cao under 24-hour security police surveillance (now lifted). Almost simultaneously with Cao’s calls came news that an experimental, directly elected community council may be envisaged for a Beijing neighborhood.20 Reporters did not expect a dramatic democratic breakthrough, but was this a straw in the wind? This is not to suggest that the Communist Party has changed its colors and is preparing to lead China through a transformation to democracy. But evidently the issue is alive in China and the Party is attempting to deal with it. Almost inevitably, that will lead to experiments in limited opening—and those, as we saw in the late 1980s and early 1990s, usually lead to far greater changes than their authors envisage. The reason that the Party is playing with democratic fire is simple: popular pressure, at home and from the Chinese diaspora, and the knowledge within the political class that whoever succeeds in channeling into democratic institutions the aspirations and free-floating resentments of today’s China will emerge as a winner.

#### Internal CCP reports already advocate reform to prevent social instability

Yongnian Zheng, 2002. East Asian Institute, National University of Singapore. “State Rebuilding, Popular Protest and Collective Action in China,” Japanese Journal of Political Science 3.1, <http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=109229>.

The report, written by a scholar from the State Planning Commission of the State Council, advised the Chinese government that something had to be done to cope with rising social protests in the country. A latest report (2001) also recognized a spreading pattern of collective protests and group incidents arising from economic, ethnic and religious conflicts in China. The report, produced by a research team organized by the Department of Organization of the Central Committee of the Chinese Communist Party, warned that the coming years of rapid change, driven by the opening of markets to foreign trade and investment, are likely to cause greater social conlicts. The report made urgent recommendations for changes to save the party and the nation by reducing popular grievances.

### Oil

#### Double-bind – either relations are resilient b/c of security concerns

**Lippman, 12** [January, “Saudi Arabia on the Edge: The Uncertain Future of an American Ally”, journalist and author, specializing in the [Middle East](http://en.wikipedia.org/wiki/Middle_East) and [US](http://en.wikipedia.org/wiki/United_States)-[Saudi](http://en.wikipedia.org/wiki/Saudi_Arabia) relations.[[1]](http://en.wikipedia.org/wiki/Thomas_Lippman#cite_note-Mideasti-0) Lippman graduated form [Columbia University](http://en.wikipedia.org/wiki/Columbia_University). Lippman spent more than 30 years with the [Washington Post](http://en.wikipedia.org/wiki/Washington_Post) as a writer, editor and diplomatic correspondent,[[2]](http://en.wikipedia.org/wiki/Thomas_Lippman#cite_note-SUSRIS-1) also serving as the Middle East [bureau](http://en.wikipedia.org/wiki/News_bureau) chief for the Washington Post.[[3]](http://en.wikipedia.org/wiki/Thomas_Lippman#cite_note-PBS-2) Lippman currently serves as an adjunct scholar at the [Middle East Institute](http://en.wikipedia.org/wiki/Middle_East_Institute), p. the Google books]

The strength and durability of the alliance can be seen in the fact that it has weathered **crises** and disputes that might have caused a long-term rupture between countries less **firmly entwined**: the disappointment of King Abdul Aziz and the fury of his most trusted son. Faisal, over President Truman`s recognition of lsrael in l948; the Arab oil embargo prompted by U.S. support for Israel in the 1973 Middle East War; American outrage over Saudi participation in the terror attacks on New York and the Pentagon on September ll, 2001; and Saudi anger at the U.S. invasion of Iraq, which in Riyadh's view strengthened **Iran and Shia Islam** at Saudi expense. (King Abdullah shocked Washington with a 2007 speech at an Arab summit conference that denounced the "illegitimate foreign occupation" oflraq.) When Barack Obama became president in january 2009, he inherited a bilateral relationship deeply strained by Saudi resentment over the policies of his predecessor, George VV. Bush, especially Buslfs ill-atlvisctl and ill-fated effort to move Saudi Arabia toward political liberalization as the price of continued U.S. friendship. Saudi A|';\l1ia`s association with the events of 9/'ll brought to the surface a deep reservoir of popular antipathy in the United States. An outpouring, of books. articles, political speeches, and movies excoriated thc kingdom for its support of religious extremism and its dismal human rights record. During the extremist insurgency that began in 2003, thousands of Americans \vho had been living in Saudi Arabia left because of the rising security threat, n threat that was exaggerated hy hair-raising warnings from the State Department. The Saudi insurgency also coincided with a rising Arab wave of anti-American sentiment over the U.S. invasion of Iraq. Those years represented one of the **darkest periods** in the history of the alliance. Yet even then, there was **no prospect** of an outright **rupture** between Washington and Riyadh because neither side wanted or could afford such a development. The United States needed the Saudis' cooperation in the war on terrorism and in cutting off the flow of money to extremist groups. And Saudi Arabia continued to rely on the United States to confront the threat from the kingdom's most powerful rival, Iran. Differences over Iraq and the Israeli-Palestiiiiam question could not be allowed to interfere with those strategic realities. The Final Re/fort of the National Commission on Terrorist Attacks upon the United States, popularly known as T/ae 9/ll Commission Report and issued in 2004, gave Bush the political cover he needed to rebuild the relationship whcn ir "found no evidence that the Saudi government as an institution or senior Saudi officials individually" funded the al-Qaeda networl<."˜ The commission did not absolvc the Saudi government from responsibility for creating an zitmospliere in which al-Qaetla could flourish and noted that individual Saudi citizens had been financial backers of the organization. The Bush administration and thc Saudi govcrnmcnt, llowcvcr. chose to emphasize the report's positive findings as they strove to repair the damage done by the 9/ll attacks. By the end of his second term, Bush had retreated from his efforts to dcmoeratize the Middle East, and on a last trip to Riyadh in May 2008 he signed a new package of bilateral agreements, including a U.S. commitment to help Saudi Arabia develop civilian nuclear energy. The White Housc's fact sheet describing the results ofthe presid::nt's visit said the agreements "further cement the longstanding U.S.-Saudi friendship and close cooperation to help bring peace and stability to the region and its people." liven in the darkest days, the extensive bilateral business relationships remained in place. American companies lowered their profile in the kingdom, but Saudi Arabia retained its standing as the largest U.S. trading partner in the Middle East. Although Bush worked hard in his last few years as president to pull the bilateral relationship back from the brink of disintegration, there was a palpable sense of relief in Riyadh \vhen his presidency ended. ()l"l"IM ISM A BOUT (IBA MA Saudi Arabia regarded President Obama optimistically, if only because he was IIOI Bush, and Obama set out almost immetliately upon becoming president to restore harmony to the relationship. On his first trip to the Middle East, he first stopped in Riyadh and mer with King Abdullah before heading to Cairo to deliver his landmark speech about U.S. relations with the Muslim world. The Saudis appreciated the gesture, but Obama's relations with Aladullah got off to a rocky start when the president, who was poorly briefed, asked the king for unilateral gestures of goodwill toward Israel, such as extending to Israeli aircraft the right to fly over Saudi airspace. As was predictable, the king rebuffed the president. The Saudis' position is that they crafted, and persuaded all members of the League of Arab States to endorse. a comprehensive peace offer based on Israe1`s return to its pre-1967 borders. They feel they have no obligation to do more. Saudi foreign minister Prince Saud Al-Faisal said as much a year later, after meeting with Secretary of State Hillary Rodham Clinton in Washington the eve of f\bdullah's return visit. "The question is not what the Arab world will offer-that has been established: an end to the conflict, recognition, and full normal relations as exist between countries at pence," he said. "The question really is: what \vill Israel give in exchange for this comprehensive offer?" But the prince also declared, "Our two nations have been friends and allies for over seven decades. We have seen the coming and breaking of many storms. Over time, the relationship has grown stronger, broader, and deeper. And our discussion today reflected the |I`li\[ll|'l[}' of this relationship. lt was frank, honest and open-just as it should be among friends." The open differences over policy toward the Israeli-Palestinian conflict are hardly new; indeed, they have been part of the bilateral discussion since Roost-velt's meeting with Abdul Aziz. The deep **economic and strategic ties** between the two countries remain in place despite those differences, as they always have.

#### OR Alt causes outweigh – Collapse inevitable in the short term, selectorate theory – prefer recent empirical studies

**Fang, et al 12** [January, “NEW ALIGNMENTS THE GEOPOLITICS OF GAS AND OIL CARTELS AND THE CHANGING MIDDLE EAST”ASSISTANT **PROF**ESSOR **OF** **POLI**TICAL **SCI**ENCE **RICE UNIVERSITY** AMY MYERS JAFFE WALLACE S. WILSON FELLOW IN ENERGY STUDIES JAMES A. BAKER III INSTITUTE FOR PUBLIC POLICY RICE UNIVERSITY TED TEMZELIDES, **PH.D.** RICE SCHOLAR, JAMES A. BAKER III INSTITUTE FOR **PUBLIC POLICY PROF**ESSOR OF ECONOMICS, RICE UNIVERSITY, <http://bakerinstitute.org/publications/EF-pub-GasOilCartels-012312.pdf>]

Our model’s prediction that the status quo alignment of interests in the energy markets is stable depends critically on the assumption that Saudi Arabia and Qatar view their alliances with the United States as central to their geopolitical interests. More specifically, in our model this assumption prevents the formation of a coalition between Russia and Saudi Arabia in the oil market, and between Russia and Qatar in the natural gas market. However, the “Arab awakening,” which continues to unfold, may bring significant changes to the **domestic conditions** in many of the countries in the region, including Saudi Arabia and Qatar. Such changes would, in turn, create new dynamics in regional relationships and could redefine the countries’ economic and security needs. These changes in domestic and regional conditions are likely to result in a decline in U.S. influence in the region, which would in turn reduce the geopolitical payoffs that Saudi Arabia and Qatar derive from their alliances with the United States. If this occurs, our model can no longer rule out the possibility of new stable coalitions involving Russia. We analyze the likelihood of such a scenario next. The implications of democratization in the Middle East for U.S. influence in the region have already generated much discussion in the media.30 Such an argument can also find support in a **prominent empirical finding** in the body of international relations research, which is that democracies tend not to engage in conflict with each other.31 However, others have pointed out—in reference to Egypt, in particular—that there is no guarantee that a popularly elected government will be friendlier to the United States than its autocratic predecessor.32 Both sides of these arguments, however, miss a fundamental institutional difference between democracies and non-democracies: the support of a greater proportion of the population and a larger number of internal political coalitions is necessary for a government to stay in power in a democracy. We believe that this difference could lead to a decrease in U.S. influence in the region, including in issues related to energy policy. The thrust of our argument is as follows. A government’s survival in a democracy depends on the support of a larger set of the population than is necessary for authoritarian regimes or monarchies. As some countries move quickly to democracy and others do not, even traditional The Geopolitics of Gas and Oil Cartels and the Changing Middle East 22 monarchies will **be forced to broaden political participation** within their borders and widen the distribution of economic benefits and patronage. For instance, since February 2011, both Saudi Arabia and Qatar have revived suspended local elections. The Kingdom reintroduced municipal elections in 2011 in response to a number of small protests held around the Kingdom inspired by protest movements in Tunisia and Egypt. As Saudi and Qatari leaders take popular sentiments into account, it will become **more difficult for governments to disregard the reactions of** **domestic audiences** on important economic and security issues in order to satisfy the policy demands of the United States. Consequently, **a close relationship with the U**nited **S**tates **may no** **longer be sustainable**, or it might come at the cost of losing significant domestic support.33 Either way, the payoff from cooperating with the United States may decrease, making alternative policy choices more attractive. This may include cooperating with Russia to sell oil and gas at higher prices in order to meet domestic economic and political demands.34 In what follows, we develop this argument more rigorously, drawing on the theory of political survival proposed by Bueno de Mesquita et al. (1999, 2003).35 Bueno de Mesquita et al. classify domestic political institutions by defining two key concepts: the winning coalition and the “selectorate.”36 The winning coalition is the subset of the population whose support is necessary for a leader to stay in power. The selectorate is the subset of the population from which the winning coalition is drawn. Democracies have the largest selectorates because they impose the fewest restrictions on who can participate in selecting leaders—usually only an age limit—often applying the majority rule to elections; they also have the largest winning coalitions. Leaders retain their power if their winning coalitions are satisfied with the benefits that the leaders provide for them. Bueno de Mesquita et al. assume that the benefits come in two forms: public goods and private goods. Public goods are enjoyed by all members of a society, while private goods can only be consumed by a member of a leader’s winning coalition. Given limited resources at a leader’s disposal, the leader must decide how to allocate the resources between these two types of goods to maximize his chance of staying in office. If the winning coalition is small, then it is optimal to provide private goods to keep the members of the winning coalition happy. However, if the winning coalition is large, as in a democracy, it is less efficient to divide limited resources among a large number of people, because the increase in the individual benefit can be negligible. Thus, the theory predicts that democratic leaders will be more inclined to provide public goods whose benefit does not diminish with an increase in the number of people enjoying them. Applying the theory of the selectorate and winning coalition, we argue that leaders can conduct foreign policies with a primary goal of buying support with private goods for their supporters, or with a goal of providing public goods for the population at large. Traditionally, the United States has exerted influence on the foreign policies of the regimes in the Middle East by negotiating with a small set of political elites. Such an approach has worked well because the regimes were autocratic or monarchic, and the political survival of the leaders only depended on making a small subset of the population (i.e., the winning coalition) happy with the private goods that they derived from the policies. Democratization, on the other hand, means that foreign policies aim to satisfy a significantly expanded winning coalition, which makes providing public goods with foreign policies more attractive for a government. Providing more public goods requires higher oil revenues, which implies high oil prices; therefore, a democratically elected government will be much more constrained in keeping the prices low in exchange for security benefits from the United States, especially if the security benefits can also come from alternative sources. Such a shift in the main factor behind foreign policy decision-making will occur if Saudi Arabia and, to a lesser degree, Qatar become more democratic.37 **Even if these countries remain nondemocratic**, **an increased sensitivity of the ruling class** in the two countries to the preference of a larger segment of the society will have a similar (if smaller) effect. Saudi Arabia has already instituted a number of domestic reforms in response to the current political atmosphere in the Middle East. The Kingdom implemented a new round of municipal elections at the end of September 2011, with more than 5,000 male candidates on the ballot. According to the electoral commission, more than 1.2 million Saudi men registered to vote. The first phase of the elections was held in April 2011. Voters selected representatives to fill half the seats in the Kingdom’s 285 municipal councils, with the other half appointed by the government. Women were not allowed to participate in recent voting, although the king has decreed that women will be allowed to participate in the next elections, theoretically to be held in four years. The Geopolitics of Gas and Oil Cartels and the Changing Middle East 24 Besides prompting the Saudi government to reinstitute municipal elections, the tide of democratization across the region has made the Saudi government realize that handing out private economic goods just to the elite is no longer a sustainable practice in the Middle East.38 At the end of February 2011, King Abdullah announced a $36 billion package of state support measures, including the creation of a one-year unemployment benefit payment to jobless Saudis, admission of all Saudis studying abroad into a state scholarship system, codification of a 15 percent increase in government salaries, and increased availability of home loans. The government also reiterated that it would not eliminate an inflation allowance that had boosted salaries of state employees by 15 percent over the previous three years; the allowance became part of each employee’s permanent salary. A second Saudi tranche announced in March 2011 called for an additional $93 billion to be dedicated to social benefits. In a set of royal decrees, the Saudi government boosted welfare benefits, established a minimum wage of $800 a month for state employees, gave bonuses to public sector workers and students, and committed resources for new housing. Some $67 billion alone was set aside for building 500,000 housing units and $4.3 billion was targeted for constructing more medical facilities. In addition, King Abdullah called for the creation of 60,000 security jobs within the Interior Ministry and pledged more financial resources for the religious police.

#### No chance of Saudi prolif

external pressure, treaty obligations, audience costs, fears of intervention, Iran response, reliance on US defense, and economic interests outweigh

Ibrahim **al-Marashi**, 20**10**; associate dean of international relations at Instituto de Empresa University in Madrid;  Forecasting Nuclear Proliferation in the 21st Century “Saudi Petro-Nukes?”

Saudi Arabia appears content to remain a significant but nonhegemonal regional power. It is concerned about regional nuclear weapons proliferation, and the leadership has expressed strong reservations about both Israel’s nu- clear arsenal and Iran’s nuclear intentions.There is little evidence, however, that Saudi Arabia would seek to engage directly in a regional nuclear arms race. **The most pressing threats** to the Saudi monarchy are internal, and nuclear weapons would prove ineffective against such threats. This chapter examined a variety of factors bearing on Saudi Arabia’s pres- ent and future propensity to proliferate. Solingen’semphasis on **economic orientation** is particularly appropriate in the Saudi case given the central role maintenance of vibrant external economic relations plays in Saudi foreign policy. Hymans’s theory also can be applied to Saudi Arabia due to the hierar- chical nature of the Saudi regime and the concentration of all critical security  decisions in the ofiice of the king. The policy of the Saudi leadership should be  interpreted through the filter of domestic political survival, which influences how the leadership will react to various trends and trigger events as it seeks to strengthen its own legitimacy. This approach offers an explanation for Saudi Arabia’s decades-long effort to prevent the emergence of a regional hegemon in the Middle East, its policy of slowly liberalizing domestic politics, its con- troversial purchase of CSS—2 missiles from China, its current outward-looking economic policies, and its nuclear forbearance. Among potential proliferation incentives, only regional nuclear proliferationdevelopments and considerations of Saudi regional power status/prestige appear to be significant. These pressures, however, are more than counterbalanced by the force of existing treaties, reputation, the risks of intervention by Israeli and other **major powers**, the danger of inadvertently stimulating Iran’s nuclear program in a more threatening direction, and the existence of an **informal alliance** with a nuclear weapons state (the United States). These factors tilt decisively in the direction of Saudi nuclear restraint, a conclusion that is also consistent with the application of the theoretical models of Etel Solingen and Iacques Hymans. One possible, if unlikely, course of events that could alter the balance of proliferation incentives and disincentives would be a deterioration of the unofficial U.S. security guarantee coupled with the emergence of a nuclear—armed Iran. However, **even in the case of a dramatic deterioration of relations** with the United States in which informal U.S. security guarantees are **no longer credible**,Saudi Arabia could plausibly reorient its geostrategic dependence and seek guarantees from a number of other nuclear powers, such as Pakistan, China and Russia, each of whom has a significant stake in Saudi stability. Although regional proliferation on the heels of dramatic Iranian progress toward the acquisition of nuclear weapons would place pressure on Saudi Arabiato go nuclear, that pressure would be mitigated by the continuation of close relations with the United States, as well as the powerful force of **economic pressures** to maintain an “outward" orientation. Present and future Saudi leaders appreciate the fact that the U.S. relationship with Saudi Arabia constitutes the safest and most robust deterrent to external aggression. Indeed, a budding Saudi nuclear weapons program would not only threaten the kingdom’s scru- pulously internationalized economy and its hard-won reputation for stability and pragmatism, it would invite outside military, economic, and diplomatic aggression and intervention. The Saudis do not want any part of the spotlight Iran has enjoyed since 2003.

#### No risk or impact to Iranian power—neighboring states will balance and support the US

**Kaplan and Kaplan 2011** – \*national correspondent for The Atlantic, senior fellow at CNAS, \*\*30-year CIA vet, vice chairman of the National Intelligence Council (2/23, Robert and Stephen, The National Interest, “America primed”, http://nationalinterest.org/article/america-primed-4892, WEA)

Moreover, a nuclear-armed Iran is not a worst-case scenario. Tehran would have a few uncertain weapons, though perhaps with a confident missile arsenal of various ranges, and an early-warning system the United States and Israel could penetrate at will, even as they would bear down on Iran with all the might of their own, far-vaster nuclear arsenals. In addition, a nuclear Islamic Republic would further weaken the influence of Egypt and Saudi Arabia, and force them to rely on Israel and the United States for deterrence, even as they might develop their own nuclear arsenals as a response.

An Egypt and a Saudi Arabia forced to rely implicitly more on Israel for deterrence against Iran are more likely to put pressure on the West Bank Palestinians to conclude a peace deal with the Jewish state (though, it must be said, prospects for Middle East peace are slim under almost any circumstance). As much as liberal internationalists and neoconservatives rightly trumpet the broad benefits of democracy during this unprecedented time of democratic upheaval, it has been only Arab autocrats who have thus far come to an accord with Israel. Autocrats can act boldly, even as they can efficiently purge dissenting members of their own circles who disagree with new policies, exactly as Egypt’s President Anwar el-Sadat and Jordan’s King Hussein did in making peace with Israel. Palestinian President Mahmoud Abbas’s ability to act likewise is questionable.

Indeed, the ascent of Iranian influence is not an altogether bad development. It was lethargic Sunni Arab dictatorships, nominally pro-American, whose societies supplied the social and political conditions for the emergence of the 9/11 terrorists. The toppling of Saddam Hussein, and the consequent rise of Shia Iran as a regional power, has finally shocked sclerotic Arab leaders into actions that benefit U.S. interests: moving a bit nearer to Israel and working more closely with America. An Iranian Shia power that balances against a Sunni Arab world, democratic or not, would be an ideal outcome were Iran to go through a whole or even partial political transformation. Shia power in the future will not necessarily speak with one voice, given the prospect of ongoing tensions between Tehran and Baghdad. For even a weak Shia state in Iraq will offer a political and theological alternative to the Islamic Republic. (This is not to justify the costs of invading Iraq, only to mention the few benefits that have emerged from the effort.) And Turkey, whose Islamic democracy makes the United States uncomfortable, still has an appeal to the Arab masses on the basis of religion rather than ethnicity which serves a useful purpose: it implicitly checks Iran.

**Resilience stops the impact**

**Hamilton and Burwell 10** (Daniel S, Executive Director of the Center for Transatlantic Relations; Executive Director of the American Consortium on EU Studies; Austrian Marshall Plan Foundation Research Professor at the Paul H. Nitze School of Advanced International Studies at Johns Hopkins, and Frances, Vice President, Director of the Program on Transatlantic Relations at the Atlantic Council, former executive director of the Center for International and Security Studies at the University of Maryland, "The Setting: The United States and Europe in a G20 World," Chapter 1, http://transatlantic.sais-jhu.edu/bin/k/u/shoulder-to-shoulder-book-finaltext.pdf)

Some argue that with the Cold War over and new powers rising, the transatlantic partnership has had its day. The values and interests of Europeans and Americans have diverged, it is said, and many of our institutions are of little relevance to today’s challenges. We disagree. Our partnership remains as vital as in the past, but now we must focus on a new agenda. The new world rising compels us, urgently, to reposition our partnership to meet 21st century challenges, and to improve the tools at our disposal. In recent years, Europeans and Americans have differed on the nature of some of these challenges and how best to confront them. Such differences can be powerful. But the history of European- American relations has often been the history of difference. Merely asserting difference or reciting lists of tough issues does not make the case for estrangemen**t**. It makes the case for more effective partnership. Moreover, that which has driven us apart is much less fundamental than that which keeps us together: support for democracy, liberty, human rights, nondiscrimination and the rule of law; mutual peace and security; open, rules- based markets; and an open door to those who choose to abide by these principles and add their strength to ours. These beliefs are underpinned by deep security and economic linkages and an intensity and range of cooperation without parallel. At times, each side of the Atlantic has honored these principles in the breach. Our achievements do not always match our aspirations. But the common body of accumulated principles, norms, rules and procedures we have built and accumulated together— in essence, an acquis Atlantique— affirms the basic expectations we have for ourselves and for each other. 3 It offers a unique foundation upon which to build.

**Europe can’t solve global problems**

**Bacevich, 10** Andrew, Bacevich, Boston University IR and History Professor, March/April 2010, Let Europe Be Europe,"http://www.foreignpolicy.com/articles/2010/02/22/let\_europe\_be\_europe?page=full, 2/28]

Europe, however, is another matter. By the dawn of this century, Europeans had long since lost their stomach for battle. The change was not simply political. It was profoundly cultural.

The cradle of Western civilization -- and incubator of ambitions that drenched the contemporary age in blood -- had become thoroughly debellicized. As a consequence, however willing they are to spend money updating military museums or maintaining war memorials, present-day Europeans have become altogether stingy when it comes to raising and equipping fighting armies.

This pacification of Europe is quite likely to prove irreversible. Yet even if reigniting an affinity for war among the people of, say, Germany and France were possible, why would any sane person even try? Why not allow Europeans to busy themselves with their never-ending European unification project? It keeps them out of mischief.

### Fiscal Cliff 2AC – Wake

#### Won’t pass – can’t overcome GOP obstructionism

Kelley Beaucar Vlahos (writer for Fox News) November 7, 2012 “

Gridlock as usual or new era of compromise? Washington stares down 'fiscal cliff' crisis after election” http://www.foxnews.com/politics/2012/11/07/gridlock-as-usual-or-new-era-compromise-washington-faces-choice-after-election/

Obama and the Democrats have shown interest in letting the so-called Bush tax rates expire for the top earners, while Republicans have not shown an inclination yet for budging on it. Time will tell if there is room for negotiation -- a combination of increased revenue and cuts -- though Obama may hold the upper hand. Still, the ideological lines are firm and with the addition of two fiscal conservatives to the Republican ranks in the Senate -- Ted Cruz from Texas, and Jeff Flake in Arizona -- there might be more of a hardening than Hill watchers think, said David Boaz, senior politics analyst from the Cato Institute. "My gut level instinct would be there are fundamental differences between the Democrats and the Republicans in Congress and the election hasn't moved us any closer to resolving these questions," he said.

#### Thumpers non-unique or deny the link:

#### Immigration reform

Manu Raji (writer for Politico) November 7, 2012 “Harry Reid agenda: Filibuster crackdown, tax increases” http://www.politico.com/news/stories/1112/83514.html

Once the procedural snafus are resolved, Reid said “very high” on his priority list will be an attempt to pass an immigration overhaul, an issue important to the Latino community that powered Tuesday night’s Democratic wins. But it would certainly start a divisive and emotional debate certain to alienate conservative members of both parties. Reid said he could get 90 percent of his caucus to support such a measure. Republicans, he said, would block immigration reform “at their peril.” “Not for political reasons; because it’s the wrong thing to do to not have comprehensive immigration reform,” Reid said. “The system’s broken and needs to be fixed.”

#### Sportman act

Chad Pergram (writer for Fox News) October 27, 2012 “The Hitchhiker's Guide to the Lame Duck Session of Congress” http://politics.blogs.foxnews.com/2012/10/27/hitchhikers-guide-lame-duck-session-congres

The Congressional schedule for this lame duck session is remarkably abbreviated. The House and Senate are both slated to next meet on Tuesday, November 13. That's a little later simply because that Monday is Veterans' Day. The Senate hasn't set any schedule other than a procedural vote at 5:30 pm on "The Sportsmen Act." But the House plans to be in session through the 16th and then take off the next week for Thanksgiving. The House then comes back November 27-30, December 3-6 and December 11-14. That's an incredible time-crunch. For starters, no one on Capitol Hill is anticipating the House freshman to start arriving until the week of November 13th. Then there are leadership elections in both bodies. House Minority Leader Nancy Pelosi (D-CA) says Democratic leadership elections won't hit until November 29. So in addition to figuring out which party is in charge of what (if electoral disputes linger), it doesn't look like Congress can truly get down to business on the pressing legislative issues until December.

#### Wind PTC

Peter Schorsch (Executive Editor of SaintPetersblog and President of Extensive Enterprises Online, LLC) November 8, 2012 “Lawmakers face a busy lame duck session” http://saintpetersblog.com/2012/11/lawmakers-face-a-busy-lame-duck-session/

Wind energy tax credits: “After simmering for the better part of this year, the battle over the wind-energy production tax credit will reach a fevered pitch during the lame-duck session. But supporters and detractors of the policy, which will expire at year’s end unless both chambers vote to renew it, acknowledge that the tax credit’s fate hinges less on its own particular merit and more on how successful lawmakers are at striking a deal to extend a wide range of tax extenders.”

#### Fallback deal solves the impact

Robert Schroeder (writer for MarketWatch) October 25, 2012 “Of 5 'fiscal cliff' outcomes only 1 is disaster” Lexis

New deal: There's no shortage of advice for the White House and Congress on how to avoid the fiscal cliff and rein in the deficit. So why shouldn't they take it? In the event that lame-duck negotiations between Obama and Republicans blow up, they could fall back on something like a recently released framework from the Bipartisan Policy Center. The suggested legislation envisions turning off the fiscal cliff, but would require a down payment of tax and spending changes that would be built on as part of a bigger debt reduction package in 2013. The aim is to save $4 trillion over 10 years. It's doubtful that the president and lawmakers would simply take a single policy group's advice wholesale. But elements could wind up in a surprise deal.

#### Support for ocean energy growing—EPRI study creates momentum.

Richard **Meyer**, 5/31/**2005**. President at the Ocean Energy Council. “Energy Ocean 2005, a brief review,” <http://www.otecnews.org/articles/energyocean2005.html>.

The keynote speaker, Spencer Abrahim, Secretary of Energy until he left the Bush administration in February, was upbeat and supportive of the development of ocean energy. He mentioned the February, 2005 study by the [Edison Power Research Institute (EPRI)](http://www.epri.com/) on ocean energy four times, as a prime resource and repeatedly noted that it will serve as a great aid in seeking federal, industry and financial support. He said it was “critical to get congressional support” and that “the ocean energy industry has matured over the past few decades, and the technologies are becoming commercially viable at a time when our nation seeks greater energy independence. The time is right”. Moreover, the Secretary laid out a general game plan for those us advocating the implementation of ocean energy.

#### Regulation generally is unpopular – streamlining political regulations is politically expedient and popular

**Lehrer 12** [Eli Lehrer is vice president of the Heartland Institute, The Weekly Standard, “One Rule at a Time, The right way to cut government red tape”, MAR 26, 2012, VOL. 17, NO. 27]

But this doesn’t mean deregulation is a lost cause. Even people who say they want more regulation will often express a different opinion when confronted with the specifics of a given rule. Examples abound. A poll conducted by Lincoln Park Strategies on chemical regulation showed that almost 70 percent of voters rejected chemical ban schemes based on the EU-adopted “precautionary principle” that bans chemicals even if they are not proven unsafe. The same poll found that chemical manufacturers themselves were more trusted than political leaders when it came to deciding regulatory bans.¶ This type of overbroad just-to-be-safe ban—currently being considered on the chemical Bisphenol A (BPA)—is a key example of a regulation with real costs that lacks support. Right now, environmental activists have forced the FDA to rule on banning BPA for use in food applications by March 31. But a BPA ban would privilege speculative benefits over real detriments to human safety: BPA is the key component of shatterproof children’s products and epoxy linings that keep bacteria out of canned foods. As such, a BPA ban is just the sort of move that could become unpopular and arouse public resistance to the regulatory state.¶ And BPA isn’t alone. Steve Pociask of the American Consumer Institute, which has done dozens of polls on Americans’ attitudes toward government regulation of everything from energy development to cable television to North Carolina auto insurance, finds an obvious pattern. “People want oversight from the government, they favor regulation in the abstract,” he says. “But when it comes down to specific new rules and regulations, they tend to be very skeptical and, more often than not, opposed. Particularly when you explain it to them.”¶ Pociask’s reserve of polls—several hundred questions over the past five years—shows a great many proposed regulations are unpopular when they are described. Pollster Scott Rasmussen also has identified widespread sympathy for deregulation of small business.¶ The disconnect may be easy to explain. Many people favor government doing something about a wide range of social problems but are skeptical of particular proposals. “Something,” in fact, can mean any number of things, including efforts to improve and streamline enforcement of rules already on the books.

#### PC not key

**Klein, 3/19/12** [The Unpersuaded Who listens to a President? by [Ezra Klein](http://www.newyorker.com/magazine/bios/ezra_klein/search?contributorName=ezra%20klein) March 19, 2012, Ezra Klein is the editor of Wonkblog and a columnist at the Washington Post, as well as a contributor to MSNBC and Bloomberghttp://www.newyorker.com/reporting/2012/03/19/120319fa\_fact\_klein#ixzz1p36PrMbH]

This, Edwards says, is the reality facing modern Presidents, and one they would do well to accommodate. “In a rational world, strategies for governing should match the opportunities to be exploited,” he writes. “Barack Obama is only **the latest** in a **long line** of presidents who have not been able to transform the political landscape **through** their efforts at **persuasion**. When he succeeded in achieving major change, it was by mobilizing those ***predisposed* to support** him and driving legislation through Congress on a party-line vote.”

That’s easier said than done. We don’t have a system of government set up for Presidents to drive legislation through Congress. Rather, we have a system that was designed to encourage division between the branches but to resist the formation of political parties. The parties formed anyway, and they now use the branches to compete with one another. Add in minority protections like the filibuster, and you have a system in which the job of the President is to persuade an opposition party that has both the incentive and the power to resist him.

Jim Cooper says, “We’ve effectively lost our Congress and gained a parliament.” He adds, “At least a Prime Minister is empowered to get things done,” but “we have the extreme polarization of a parliament, with party-line voting, without the empowered Prime Minister.” And you can’t solve that with a speech.

#### Winners win

**Halloron, 10** [Liz, National Public Radio, “For Obama what a difference a win will make”, <http://www.npr.org/templates/story/story.php?storyId=125594396>]

Amazing what a win in a **major legislative battle** will do for a president's spirit. (Turmoil over spending and leadership at the Republican National Committee over the past week, and the release Tuesday of a major new and largely sympathetic book about the president by New Yorker editor David Remnick, also haven't hurt White House efforts to drive its own, new narrative.) Obama's Story New Yorkereditor David Remnick has a new book out about Obama. Listen to an interview with Remnick and read a review. ['The Bridge': Remnick On The Ascent Of Obama](http://www.npr.org/templates/story/story.php?storyId=125595945&ps=rs) April 6, 2010 ['Bridge' Tells Obama's Story, Just As We Remember It](http://www.npr.org/templates/story/story.php?storyId=125093691&ps=rs) April 5, 2010 Though the president's national job approval ratings failed to get a boost by the passage of the health care overhaul — his numbers have remained steady this year at just under 50 percent — he has earned grudging respect even from those who don't agree with his policies. "He's achieved something that virtually everyone in Washington thought he couldn't," says Henry Olsen, vice president and director of the business-oriented American Enterprise Institute's National Research Initiative. "And that's given him confidence." The protracted health care battle looks to have taught the White House something about power, says presidential historian Gil Troy — a lesson that will inform Obama's pursuit of his initiatives going forward. "I think that Obama realizes that **presidential power is a muscle**, and the more you exercise it, the stronger it gets," Troy says. "He exercised that power and had a success with health care passage, and now he wants to make sure people realize it's not just a blip on the map." The White House now has an opportunity, he says, to change the narrative that had been looming — that the Democrats would lose big in the fall midterm elections, and that Obama was looking more like one-term President Jimmy Carter than two-termer Ronald Reagan, who also managed a difficult first-term legislative win and survived his party's bad showing in the midterms. Approval Ratings Obama is exuding confidence since the health care bill passed, but his approval ratings as of April 1 remain unchanged from the beginning of the year, according to [Pollster.com](http://www.pollster.com/polls/us/jobapproval-obama.php). What's more, just as many people disapprove of Obama's health care policy now as did so at the beginning of the year. According to the most recent numbers: Forty-eight percent of all Americans approve of Obama, and 47 disapprove. Fifty-two percent disapprove of Obama's health care policy, compared with 43 percent who approve. **Stepping Back From A Precipice** Those watching the re-emergent president in recent days say it's difficult to imagine that it was only weeks ago that Obama's domestic agenda had been given last rites, and pundits were preparing their pieces on a failed presidency. Obama himself had framed the health care debate as a referendum on his presidency. A loss would have "ruined the rest of his presidential term," says Darrell West, director of governance studies at the liberal-leaning Brookings Institution. "It would have made it difficult to address other issues and emboldened his critics to claim he was a failed president." The conventional wisdom in Washington after the Democrats lost their supermajority in the U.S. Senate when Republican Scott Brown won the Massachusetts seat long held by the late Sen. Edward Kennedy was that Obama would scale back his health care ambitions to get something passed. "I thought he was going to do what most presidents would have done — take two-thirds of a loaf and declare victory," says the AEI's Olsen. "But he doubled down and made it a vote of confidence on his presidency, parliamentary-style." "You've got to be impressed with an achievement like that," Olsen says. But Olsen is among those who argue that, long-term, Obama and his party would have been better served politically by an incremental approach to reworking the nation's health care system, something that may have been more palatable to independent voters Democrats will need in the fall. "He would have been able to show he was listening more, that he heard their concerns about the size and scope of this," Olsen says. **Muscling out a win** on a sweeping health care package may have invigorated the president and **provided evidence of leadership**, but, his critics say, it remains to be seen whether Obama and his party can reverse what the polls now suggest is a losing issue for them. **Golden Boy Tested** One of the questions that has trailed Obama is how he would deal with criticism and the prospect of failure, says Troy, a McGill University history professor and visiting scholar affiliated with the bipartisan Policy Center in Washington. "He is one of those golden boys who never failed in his life, and people like that are often not used to criticism and failure," Troy says. Obama and his campaign were temporarily knocked for a loop early in the 2008 presidential campaign by then-GOP vice presidential candidate Sarah Palin's "zingers," Troy says, "and Obama was thrown off balance again by the loss of the Massachusetts Senate seat." The arc of the health care debate reminded observers that Obama is not just a product of Harvard, but also of tough Chicago politics, Troy says. "You don't travel as far and as fast as Barack Obama without having a spine of steel," he says. "He has an ability to regenerate, to come back, and knows that there is no such thing as a dirty win: a win is a win" — even if it infuriates the progressive wing of the president's party, which wanted far more sweeping changes to the nation's health care system. **GOP Stumbles** Obama's new mojo has been abetted, in a way, by high-profile troubles at the Republican National Committee. RNC Chairman Michael Steele has been under fire over the past week for his spending on private jets and limousines, and a staffer resigned after submitting to the committee a nearly $2,000 tab for a visit by young party members to a risque Los Angeles nightclub. The disarray intensified Monday with the resignation of the committee's chief of staff, and growing anger among top GOP strategists and fundraisers. "Steele has kept Republicans off-message," says West, of Brookings. "Every story about RNC spending is one less story about their views on health care at a time when news coverage has shifted in a more favorable direction." The distraction continued Monday when detractors accused Steele of playing the race card after he told ABC News that as an African American, he, like Obama, is being held to a higher standard. White House Spokesman Robert Gibbs, when asked about Steele's assertion, said the RNC chairman's problem "isn't the race card, it's the credit card." The controversy, Olsen says, hasn't been good for the Republicans' preparations for elections in terms of money and organization. But he doesn't view it as "a voter issue." **How Win Translates** When Reagan won his tough legislative battle in the early 1980s, it was over tax cuts, something voters saw as directly related to the then-dismal economy. Obama has long made a case for health care reform as a big piece of economic reform, but it's a difficult argument to make to voters, Olsen says, particularly when many of the health care law's major provisions don't go into effect for another four years. But observers like Troy say they believe that though initially unrelated, a boost in employment among Americans would encourage voters to look more favorably on the health care overhauls. "The perceived success of health care legislation rides on job creation," Troy says. Economists have recently declared the nation's recession, which began in 2007, over. But the unemployment rate has remained stubbornly at just under 10 percent. "I think he understands he's in a crucial period of his presidency," Olsen says. "He's taken a lot of risks, and there's not immediate rewards." Obama faces continuing tests on other big domestic issues, including Wall Street reform, the economy and climate change, as well as myriad foreign policy challenges ranging from testy relations with Israel and uncertainties about Iran's nuclear capabilities, to wars in Iraq and Afghanistan. Late last month, the administration and Russia agreed to a new nuclear arms treaty that is expected to be signed Thursday in advance of an international summit in Washington. The world is waiting, Troy says, to see how the president's renewed confidence plays out on the international stage. But the newly invigorated president continues to encourage voters to wait and see what his efforts produce.

#### No compromise --- not enough time.

**Yellin**, **11/9**/2012 (Jessica – CNN Chief White House Correspondent, Analysis: Obama has limits on debt deal, CNN Politics, p. http://www.cnn.com/2012/11/09/politics/obama-debt-limit/index.html)

In his address at the White House Friday afternoon, the president stressed the importance of congressional action and compromise, including a bill to protect 98% of Americans who will experience a significant tax hike at the end of the year if a deal is not reached. "I've got the pen ready to sign the bill right away," Obama said in the White House East Room, referring to the plan to extend tax cuts for those making under $250,000 a year. "I'm ready to do it; I'm ready to do it." The president said the election proved Americans are on his side in regard to taxes and entitlement reform. "Our job is to get the majority in Congress to reflect the will of the people," he said, before adding he was encouraged by Boehner's openness to tax revenue. Obama held firm on the ideas he espoused on the campaign trail that were also included in a detailed plan the White House sent to Capitol Hill in fall 2011. But there is not much time to negotiate before the new year, a time frame further limited by the Thanksgiving holiday and a just-announced trip by the president to Asia. Republicans sources argued it is unlikely the parties can resolve the sticking points in a lame-duck session of Congress, adding they need to agree on a framework deal that can be resolved in 2013. But don't expect any eye-popping new positions. Sources said the president believes he's been exceedingly clear about how he would like to avoid the painful cuts that would kick in. Throughout his campaign he reiterated his positions while also making clear he would not sign a bill that retained the current low tax rates for the richest Americans.

#### No impact to fiscal cliff

Stan Collender (partner at Qorvis Communications) June 12, 2012 “Some Argue Fiscal Cliff May Not Be All That Scary” Lexis

Remember the "fiscal cliff" that everyone from Federal Reserve Board Chairman Ben Bernanke to analysts of every political stripe to media pundits have been talking about so incessantly in recent weeks as something that absolutely has to be avoided? Yes, that fiscal cliff: the one we've repeatedly been told will result in end-of-the-world damage for the economy as the clock strikes midnight on Jan. 1 and the one that has been driving up the nation's collective blood pressure to such an extent that we're all going to need the economic equivalent of Valium to get through the coming months. Well, it turns out that the cliff isn't that scary after all, really shouldn't be seen as the moment when all economic hell will break loose and isn't actually something that has to be avoided at all costs. At least that's the conclusion of a well-conceived, well-written and convincing analysis released last week by the Center on Budget and Policy Priorities that explains why fears induced by the fiscal cliff are "misguided" and won't "plunge the economy into an immediate recession." A quick word about the CBPP: Almost everyone takes its analyses seriously. Its staff includes not only some of the most reputable federal budget analysts in Washington, but the analysts that other analysts go to for information, advice and reality checks. They're highly experienced, credentialed and credible. Even those who disagree with the CBPP's politics seldom, if ever, argue with its understanding of the budget process. That's only one of two reasons I found the CBPP's analysis that the cliff isn't as scary as we've been told to be so convincing. The other is that the analysis ignored the frightening headlines and instead considered the actual mechanics of how the federal budget works. In doing so, it discovered (actually, "reminded" is probably more accurate) that little happens instantly in the world of the federal budget. The CBPP's conclusion is simple: There will be little immediate effect if the increase in taxes and cuts in spending that will happen during the period from midnight Dec. 31 to midnight Jan. 2 go into effect. In other words, there is no steep fiscal cliff off of which the U.S. economy will take an abrupt nosedive if the tax increase and spending cut policies are triggered. The CBPP correctly points out that the spending cuts scheduled to occur Jan. 2 because the anything-but-super committee failed to agree on a deficit reduction plan are reductions in spending authority. The actual reductions in spending - "outlays" in federal budget jargon - won't occur all at once as the visual image of a fiscal cliff virtually demands you picture, but rather, as the CBPP says "over the course of the year and into subsequent years." Therefore, there will be little immediate direct negative effect and an inability or unwillingness to make a decision by Jan. 2 will not plunge the economy into darkness. The same is true of most of the fiscal cliff tax changes. The CBPP points out - again quite correctly - that the individual income tax increases will not immediately reduce taxpayers' cash flow by the total but rather by a very small amount. And the increase in the alternative minimum tax for those who become subject to it for the first time in 2012 because it isn't fixed by Dec. 31 won't be felt at all until each taxpayer files her, his, or their tax return for the year. Given that a taxpayer doesn't typically receive the W-2s they need to file until later in January, that means that there will be plenty of time to deal with this retroactively before it starts to bite. These spending cuts and tax provisions alone make up more than half of the projected direct effect of the fiscal cliff. Add the limited immediate effect of the other provisions, and the fiscal cliff becomes one of the biggest misnomers and misconceptions in federal budget history. That's a good thing because, as I've explained in a previous column, last-minute, desperate legislating in a lame-duck session of Congress in general is never a good idea. It's especially not something that should be planned or hoped for when the decisions, like these, are potentially momentous and the time pressures appear to be extreme. In the current hyper-partisan take-no-prisoners political environment in Washington that could be even worse between Election Day and the start of the next session of Congress, that's a recipe for a policy disaster. That's why the CBPP analysis is very good news. The wisdom that has become increasingly common since Bernanke first uttered the phrase "fiscal cliff" is not as accurate as we've been told up to now. Yes, as the Congressional Budget Office pointed out in its bold report from several weeks ago, the combination of spending cuts and tax increases that will occur Jan. 1 and 2 will, if they're not modified, push the U.S. economy into a recession. But that won't happen instantly and, no matter what's being said, Congress and the White House don't have to agree to just any deal to resolve the situation by the time these policies are triggered to prevent the projected damage.

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#### Withdrawal causes nuclear conflicts – the US would be forced to re-intervene

**Lieber 2005** – Professor of Government and International Affairs at Georgetown University [Robert J., The American Era: Power and Strategy for the 21st Century, p. 53-54]

Withdrawal from foreign commitments might seem to be a means of evading hostility toward the United States, but the consequences would almost certainly be harmful both to regional stability and to U.S. national interests. Although Europe would almost certainly not see the return to competitive balancing among regional powers (i.e., competition and even military rivalry between France and Germany) of the kind that some realist scholars of international relations have predicted," elsewhere the dangers could increase. In Asia, Japan, South Korea, and Taiwan would have strong motivation to acquire nuclear weapons – which they have the technological capacity to do quite quickly. Instability and regional competition could also escalate, not only between India and Pakistan, but also in Southeast Asia involving Vietnam, Thailand, Indonesia, and possibly the Philippines. Risks in the Middle East would be likely to increase, with regional competition among the major countries of the Gulf region (Iran, Saudi Arabia, and Iraq) as well as Egypt, Syria, and Israel. Major regional wars, eventually involving the use of weapons of mass destruction plus human suffering on a vast scale, floods of refugees, economic disruption, and risks to oil supplies are all readily conceivable. Based on past experience, the United States would almost certainly be drawn back into these areas, whether to defend friendly states, to cope with a humanitarian catastrophe, or to prevent a hostile power from dominating an entire region. Steven Peter Rosen has thus fit-tingly observed, "If the logic of American empire is unappealing, it is not at all clear that the alternatives are that much more attractive."2z Similarly, Niall Ferguson has added that those who dislike American predominance ought to bear in mind that the alternative may not be a world of competing great powers, but one with no hegemon at all. Ferguson's warning may be hyperbolic, but it hints at the perils that the absence of a dominant power, "apolarity," could bring "an anarchic new Dark Age of waning empires and religious fanaticism; of endemic plunder and pillage in the world's forgotten regions; of economic stagnation and civilization's retreat into a few fortified enclaves."2

### Sea Colonies Add-on

#### Nuclear war doesn’t destroy ocean ecosystems – studies prove

International Herald Tribune 2008 (International Herald Tribune, http://www.nytimes.com/2008/04/15/world/asia/15iht-bikini.1.11998906.html?\_r=1)

**CANBERRA —** Coral is again flourishing in the crater left by the largest nuclear weapon ever detonated by the United States, 54 years after the blast on Bikini Atoll, marine scientists said Tuesday. A team of research divers visited Bravo crater, -ground zero for the test of a thermonuclear weapon in the Marshall Islands on March 1, 1954, and found large numbers of fish and coral growing, although some species appeared to be locally extinct. "I didn't know what to expect, some kind of moonscape perhaps, but it was incredible," Zoe Richards, from Australia's James Cook University, said about the team's trip to the atoll in the South Pacific. "We saw communities not too far from any coral reef, with plenty of fish, corals and action going on, some really striking individual colonies," she said. The 15-megaton hydrogen bomb was 1,000 times more powerful than the weapon that destroyed Hiroshima, Japan, in 1945, and it vaporized islands with temperatures hitting 55,000 degrees Celsius, or about 99,000 degrees Fahrenheit. The Bikini blast shook islands as far away as 200 kilometers, or 125 miles.

### T - Solar

#### Governmental support for our interp – that outweighs on predictability

**Department of Environmental Quality 12** [Deparment of Environmental Quality, governmental agency, “Solar Power”, last updated Nov 2012]

Solar Power¶ Solar power is a method of harnessing the sun's energy to generate electricity or for heating purposes. There are a variety of technologies that have been developed to take advantage of solar energy. Different types of solar power include:¶ Photovoltaic (solar cell) systems: Convert sunlight directly into electricity¶ Concentrating solar systems: Use reflective materials to utilize the sun's heat to produce electricity¶ Passive solar heating and daylighting: Use solar energy to heat and light buildings¶ Solar hot water: Heat water with solar energy¶ Solar process heat and space heating and cooling: Industrial uses of the sun's heat.

#### OTEC is solar energy

**Lennard 6** [The Swordsman, UK engineering company, OTEC - a Base Load Marine Renewable Energy, now with World-wide Application, Don Lennard BSc (Eng), FRAeS, FRINA]

OTEC is solar energy. The surfaces of the oceans ¶ capture huge amounts of this energy – most of this ¶ being stored in the form of thermal energy in the ¶ surface layers of the oceans. However, those surface ¶ layers do not mix freely or easily with the deeper ¶ waters, which are much colder.

#### Limits explosion inevitable and their interp is scientifically incoherent – multiple chemical steps between energy states

**Mahony 10** [“A ‘heat battery’ for solar power storage”, Melissa Mahony, Smartplanet, November 23, 2010]

Researchers have searched for substitutes but haven’t been able to find any. What the MIT researchers have discovered, however, is that between energy states, another step exists in which the molecule forms a semi-stable configuration. By looking at this behavior, learning more about how the molecule works (see video below), and sifting through databases of many other molecular options, the MIT scientists hope they can find another cheaper material that acts like it.¶ In a statement, MIT’s Jeffrey Grossman speaks of the storage method’s potential should such a material be found.¶ It takes many of the advantages of solar-thermal energy, but stores the heat in the form of a fuel. It’s reversible, and it’s stable over a long term. You can use it where you want, on demand. You could put the fuel in the sun, charge it up, then use the heat, and place the same fuel back in the sun to recharge.

### China

#### Econ resilient

**Reuters, 2009** (4/27, “China: One bright spot in U.S. companies' results”, http://uk.reuters.com/article/ousiv/idUKTRE53Q2DE20090427)

While consumers and businesses in much of the world are throttling back on spending, there are signs that the Chinese economy is pulling out of a short dip in growth and companies that expanded there in recent years are reaping the dividends. Optimism about China stretches across a wide range of American industry, from mining and construction equipment maker Caterpillar Inc (CAT.N) to KFC-chain operator Yum Brands Inc (YUM.N). They say its insatiable appetite for everything from heavy machinery to fast food -- due in part to an $585 billion Chinese government stimulus package -- is stabilizing the market and providing a growth outlet just when they need it most. "China has been the gold standard on the stimulus package. It was early, large, and well-designed and it's already gotten very substantial results," said Nicholas Lardy, a senior fellow at the Peterson Institute for International Economics. China's gross domestic product growth in the first quarter was only 6.1 percent, the weakest since quarterly figures were first available in 1992, but scorching when compared with the 5 percent contraction expected by economists for the U.S. economy in a recent Reuters poll. Signs that the Chinese economy is heading back to much higher growth rates over the rest of the year have resounded through the earnings season.

#### No CCP lashout

**Feng 2010** [5/10, Zhu, PhD, Professor of School of International Studies and Director of the Center for International & Strategic Studies @ Peking University, has served as research fellow @ Washington based CSIS & Fairbank Center for East Asian Studies @ Harvard University, visiting scholar @ Durham University in UK, “An Emerging Trend in East Asia: Military Budget Increases and Their Impact”, May 10, 2010, http://www.fpif.org/articles/an\_emerging\_trend\_in\_east\_asia]

Many China watchers in the West contend that the weak legitimacy of the Chinese Communist Party (CCP) has spurred its military buildup. But this is mostly an attribution error. Despite a great number of challenges from home and abroad, the CCP’s ruling legitimacy has not suffered from any shock. **The Chinese people do not believe that a change of ruling party** or the party’s relinquishing of power **will resolve their complaints**. Even if domestic unrest flares up, China would likely turn inward rather than outward, even at the cost of effectively muting an assertive foreign policy.

#### Won’t pass the nuclear threshold

**Moore 6** (Scott; Research Assistant – East Asia Nonproliferation Program – James Martin Center for Nonproliferation Studies – Monterey Institute of International Studies, “Nuclear Conflict in the 21st Century: Reviewing the Chinese Nuclear Threat,” 10/18, http://www.nti.org/e\_research/e3\_80.html)

Despite the tumult, there is broad consensus among experts that the concerns generated in this discussion are exaggerated. The size of the Chinese nuclear arsenal is small, estimated at around 200 warheads;[3] Jeffrey Lewis, a prominent arms control expert, claims that 80 is a realistic number of deployed warheads.[4] In contrast, the United States has upwards of 10,000 warheads, some 5,700 of which are operationally deployed.[5]

Even with projected improvements and the introduction of a new long-range Intercontinental Ballistic Missile, the DF-31A China's nuclear posture is likely to remain one of "minimum deterrence."[6] Similarly, despite concern to the contrary, there is every indication that China is extremely unlikely to abandon its No First Use (NFU) pledge.[7] The Chinese government has continued to deny any change to the NFU policy, a claim substantiated by many Chinese academic observers.[8] In sum, then, fears over China's current nuclear posture seem somewhat exaggerated.

This document, therefore, does not attempt to discuss whether China's nuclear posture poses a probable, general threat to the United States; most signs indicate that even in the longer term, it does not. Rather, it seeks to analyze the most likely scenarios for nuclear conflict. Two such possible scenarios are identified in particular: a declaration of independence by Taiwan that is supported by the United States, and the acquisition by Japan of a nuclear weapons capability.

Use of nuclear weapons by China would require a dramatic policy reversal within the policymaking apparatus, and it is with an analysis of this potential that this brief begins. Such a reversal would also likely require crises as catalysts, and it is to such scenarios, involving Taiwan and Japan, that this brief progresses. It closes with a discussion of the future of Sino-American nuclear relations.

#### No Taiwan war

**Saunders and Kastner 2009** – \*Senior Research Fellow at the Institute for National Strategic Studies at the National Defense University, \*Assistant Professor in the Department of Government and Politics at the University of Maryland and former China Security Fellow at the Institute for National Strategic Studies (Phillip and Scott, International Security, 33.4, “Bridge over troubled water? Envisioning a China-Taiwan peace agreement”, http://www.mitpressjournals.org/doi/pdf/10.1162/isec.2009.33.4.87, WEA)

Most observers agree that the issue of Taiwan’s status is not ripe for resolution. China remains committed to the ultimate goal of unification and refuses to renounce the use of force to prevent Taiwan independence. Former President Jiang Zemin emphasized the goal of unification, and China’s policies sometimes implied a timetable for achievement of that objective.2 China’s policy toward the Taiwan issue, however, has undergone a significant shift under President Hu Jintao, who has emphasized the short-to-medium-term goal of deterring Taiwan independence, postponing unification into the indefinite future.3

On Taiwan, public opinion polls consistently show strong (more than 75 percent) public support for maintaining the status quo. Only a small percentage favors either immediate independence or immediate unification with China.4 Although this polling reflects conditional preferences that factor in the likelihood of China using force if Taiwan were to declare independence,5 it accurately reflects the widespread view on Taiwan that permanent resolution of the issue of Taiwan’s status is not presently possible. While the Democratic Progressive Party (DPP) has sought to mobilize voters by highlighting Taiwan’s separate identity and sought ways to emphasize Taiwan’s sovereignty during President Chen Shui-bian’s term in office, the KMT has adjusted the emphasis in its cross-strait policy to more closely match the views of mainstream Taiwan voters. In the 2008 presidential campaign, KMT candidate (and eventual victor) Ma Ying-jeou articulated “three nos” that would govern policy toward China in his administration. These were a pledge that there would be no pursuit of de jure independence, no negotiations with the mainland about unification, and no use of force.6 President Ma reiterated these points in his May 20, 2008, inaugural address.

Collectively, these positions suggest that China and Taiwan may be prepared to defer the issue of Taiwan’s status for resolution at some point in the future. **Both sides have expressed the desire to improve relations, expand cross-strait contacts, and negotiate a peace agreement** between Taipei and Beijing. These goals were articulated in the joint press communiqué issued following KMT Chairman Lien Chan’s April 2005 meeting with Chinese President Hu Jintao.7 Hu Jintao reiterated China’s willingness to negotiate a peace agreement with Taiwan in his statements at the October 2007 17th Party Congress: “On the basis of the one-China principle, let us discuss a formal end to the state of hostility between the two sides, reach a peace agreement, construct a framework for peaceful development of cross-straits relations, and thus usher in a new phase of peaceful development.”8 Both candidates in Taiwan’s 2008 presidential election called for negotiation of a peace agreement with Beijing, and President Ma repeated the call in his inaugural address.9 Upon assuming office, Ma moved quickly to restart dialogue between Taiwan’s Straits Exchange Foundation (SEF) and the PRC’s Association for Relations Across the Taiwan Straits (ARATS), the semiofficial bodies that previously served as vehicles for cross-strait dialogue.10