### 1NC T

#### Financial incentives must include funds or commitments to private actors to incentivize energy production – the aff is an indirect incentive and makes the topic unmanageable

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.

#### Violation – the aff only indirectly assists the production of energy, not financially incentivize it

#### Vote Neg for Limits – Broadly defining incentives explodes the topic – includes anything related to promiting energy – makes neg prep impossible

### 1NC CP

#### The United States federal government should

#### fully fund the construction of 250,000 synthetic trees designed for the capture of carbon dioxide.

#### develop and deploy sun shade technology

#### repeal the Budget Control Act and ensure adequate DOD funding

#### establish a legally-binding negative security assurance for all members of the Non-Proliferation Treaty regime that are in full compliance with their NPT obligations.

#### adopt a no nuclear first use declaratory policy towards permanent members of the United Nations Security Council, India, Pakistan, and Israel.

#### should state that the U.S. maintains nuclear weapons for the purposes of deterring nuclear attacks.

#### The plan can’t solve warming for a century – the counterplan reflects radiation and solves

**Angel and Worden 6** (Roger-- a Regents Professor at the University of Arizona and is on the faculty of the UA astronomy department and the Optical Sciences College, and Research Professor of Astronomy at the University of Arizona and Director of NASA Ames Research Center, “Making moon sun-shades from moondust”, Summer 2006, Ad Astra, <http://www.nss.org/adastra/volume18/angel.html>)

The Earth's surface temperature has risen by about 1 degree Fahrenheit in the past century, with accelerated warming during the past two decades. There is new and stronger evidence that most of the warming over the last 50 years is attributable to human activities. Increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise 1 to 4.5°F (0.6 to 2.5°C) in the next 50 years, and 2.2 to 10°F (1.4 to 5.8°C) in the next century, with significant regional variation. Global warming will have generally negative impacts on human life and the biosphere, so, to varying degrees, industry, scientists and policymakers are making significant efforts to mitigate the problem. Most proposals for reversing global warming are aimed at lowering greenhouse gases, most notably the Kyoto Treaty, which aims to halt the rise—and eventually to lower—greenhouse gas emissions. Technical solutions to enable current levels of economic activity to proceed with lowered emissions are under investigation and development in private industry and at universities. These solutions focus on finding non-fossil fuels, and, more to the point, non-carbon-emitting energy sources. To this end, nuclear, solar and other energy sources are promising. Dave Criswell, a physics professor at the University of Houston, is exploring the possibility that solar energy captured on the Moon could be relayed to Earth to satisfy much of its future energy needs. But even if fossil-fuel burning were stopped tomorrow, the current exceptionally high level of carbon dioxide in the atmosphere would take more than a century to dissipate. Other solutions under study therefore include the capture and underground sequestration of atmospheric carbon. Here we explore another approach for mitigating global warming, or indeed global climate change of any origin, by placing a shield at the Earth-Sun L1 point to redirect sunlight away from the Earth (or toward it to mitigate cooling). Shields Many experts have discussed a screen in space to mitigate global warming. A 2000 study by Bala Govindasamy and Ken Caldeira showed that a screen yielding a 1.8 percent reduction in solar flux **could fully reverse the current effect** of the doubling of CO2. In a controlled orbit near L1, a screen would remain permanently lined up to block a small fraction of the solar radiation. To be effective, these huge "sunglasses" would have to be 1,000 miles across, and even at gossamer thickness would weigh millions of tons. In 1989, engineer James Early, whose work fostered the creation of Telstar-1, the first American communications satellite, proposed a blocker made of thin ribbed glass to deflect the sunlight. He recognized that the costs of launching so much mass from Earth could be prohibitive, and that a practical solution might be found by making the shield from lunar material. Solar power could be used to process the material into glass and structural elements, and to drive a magnetic rail for launch into the L1 orbit. Early's idea is now worth revisiting. The value of maintaining a viable climate can be determined in different ways, and is likely to be in the range of $5 to $10 trillion—again, just a few percent of world GNP over the next 50 years. In order to find this balance, research is needed now to better understand if a shade could be implemented within the above cost ceiling, and within a few decades. To steer the full spectrum of sunlight away from the Earth, the glass needs an average thickness of about 2 micron—a fiftieth that of a human hair. Even at such light weight, a thousand- mile diameter sheet will weigh 10 million tons. To build the shield in 30 years, glass production would need to be about 1,000 tons a day, along with several hundred tons a day of titanium or aluminum for structural components. The electric power needed to mine the ore and to process it, and to accelerate 1,500 tons a day to escape the Moon and reach the L-1 point, at a 3 km/sec launch speed would be about 500 megawatts. This would require a solar plant with a couple of square kilometers of solar cells weighing about 2,000 tons. The shade would be built not as a single structure but as a constellation of many identically sized, free-flying parasol elements. For example, if each self-contained unit were as small as a 14-meter square and weighed about 1 kilogram, ten billion units would be needed to make up the shield. In manufacture, the Moon-derived structural metal would be fashioned into ultra-lightweight support struts at free-orbiting factories near L1. The screen itself, cut in squares from a 14meter-wide roll of thin glass also delivered from the Moon, would be attached to a structural cross with four 10-meter-long struts connected at a center hub. Each unit would include tilting reflecting panels, to be used as solar sails for initial placement within the constellation and for station-keeping, particularly to stabilize any drift in the unstable longitudinal direction. We envision the constellation as being like a large shoal of fish or flock of birds, with station-keeping control largely by autonomous computers in each unit to prevent collisions or self- shadowing. A local positioning system like GPS would also be used. To make ten billion units of 14-meter squares in 30 years (10,000 days) would require manufacture and placement of a million units a day at L1. If there were 1,000 factories working in parallel, each factory would have to complete a unit in little more than a minute. The factories would need to use sophisticated robots made on Earth, and might weigh in the range of 1 to 10 tons each. Economics We can make some estimate of the value of global warming from the current "carbon credit" market. Following the 1997 Kyoto Treaty, individuals or nations can purchase excess "credits" for atmospheric emission of carbon dioxide from nations that produce less than their allocated treaty quota. This amount varies between a few dollars to more than $60 per metric ton. The doubling of carbon dioxide in the Earth's atmosphere that the shield described above **would alleviate corresponds** to about 400 billion tons. Mitigating this using the carbon credit analogy would be worth trillions of dollars. The cost might be financed by selling shield credits to both nations and industries. If a group were to purchase a set amount of shield structure, this would translate directly into carbon credits. In this way, the entire project might be financed "off budget" from government funds. How to Proceed The shield would require three major high-tech elements that would likely be manufactured and launched from the Earth. The first would be the package to enable material production and launch on the Moon. This would include the robots, electronics, solar cells, wire, bearings, motors and high-temperature ceramics for the lunar manufacturing and for the rail gun to launch the manufactured items back off the Moon. It would also include the pilot facilities on the Moon to bootstrap the local manufacture of structural elements used in full-scale lunar operations. We estimate the total mass to be delivered to the Moon at around 10,000 tons. At L1, the 10 billion control units at 1 gram will also each weigh 10,000 tons, and so will the 1,000 robotic assembly factories if we allow 10 tons each. The total mass to be launched from Earth for the entire screen project of 30,000 tons is less than 0.2 percent of the screen's final mass, and even at today's high launch costs of $20,000/kg would cost less than $1 trillion to launch. Reductions in launch cost, however, would be desirable to give cushion and flexibility to the project. The cost of manufacturing the elements to be launched, including the development of the manufacturing and robotic techniques, might bring their costs to $10,000/kg or $3 trillion. Another $20 billion per year might be allocated for project management. The estimated total of less than $5 trillion is not out of line with the value of the shield—$5 to $10 trillion over several decades. The developments needed for this application with potentially immense benefits to human life on Earth are consistent with the New Vision for Space Exploration, which aims at more affordable access to space beyond near-Earth orbit. We identify several specific near-term activities that should be undertaken. It would be desirable and practical to develop and place a few prototype blocker units at L1 within a few years, to test positioning and station keeping by solar sails. The materials would be consistent with expected lunar products, and the units should have the correct mass, about 1 kg for the example we have chosen. A key requirement for the glass is that it remain crystal-clear for a century. The Sun produces darkening or "solarization" in some glass materials over long periods of time. We need to find glass that is resistant to this effect. Prospecting for the optimum lunar ores will be required. Techniques to produce the glass ingots on the Moon and to mass-produce the ribbed sheets need to be developed and tested. We envision that ultimately the glass would be rolled up for launch. Another valuable near-term step is, thus, to computer-simulate and optimize the "collective intelligence" of the blocker swarm for robustness and stability. The free-flyer control units will have to last for a century or more. Since there will likely be millions of failures, there must also be a system to identify failed units and sweep them out for refurbishment or replacement before the swarm is damaged. In Conclusion A global-warming Sun shield is a very challenging project, to say the least, but is not clearly impossible within the financial target. It seems certain that it would attract the best and brightest from across the world to solve the myriad of challenges involved, in a way that has not happened since Apollo or the Manhattan Project. It might also represent the first truly large-scale commercial and private-sector use of space, and would **certainly be of benefit to the entire population of Earth**. Now is the time to begin in earnest the development and testing of these critical technical steps.

#### Restricting U.S. security assurances to NPT members is the only way to solidify the regime and prevent proliferation

George Bunn, first general counsel @ U.S. Arms Control and Disarmament Agency, and Jean du Preez, director of the International Organizations and Nonproliferation Program @ the Center for Nonproliferation Studies @ Monterey Institute of International Studies, July/August 2007, More Than Words: The Value of U.S. Non-Nuclear-Use Promises, Arms Control, p. <http://www.armscontrol.org/act/2007_07-08/NonUse>

The Future of Negative Security Assurances To states without nuclear weapons not allied to states that do have them, a credible promise by the five NPT nuclear-weapon states not to use nuclear weapons against them should have value. Judging by the demands for such assurances from NAM, the largest caucus of NPT non-nuclear-weapon parties, the quest for legally binding NSAs will continue despite opposition from the United States and most of the P-5. At the 2000 NPT review conference, these NAM states together with the New Agenda Coalition (NAC), a smaller coalition of non-nuclear-weapon nations formed in 1998 to advance nuclear disarmament, were successful in extracting a **clear acknowledgement by all NPT parties**, in particular the P-5, that legally binding NSAs would **strengthen the nonproliferation regime**. The final document of the 2000 review conference also called on the Preparatory Committee (PrepCom) for the 2005 review conference to make recommendations on this issue. Despite several concrete proposals, including a draft nonuse protocol to the NPT submitted by the NAC, the PrepCom made no such recommendations. Indeed, the final PrepCom in 2004 reported Washington’s perception that the post-September 11, 2001, security environment obviated “any justification for expanding NSAs to encompass global legally binding assurances.” The U.S. delegation reacted to the PrepCom chairman’s summary by stating emphatically, “We did not, do not, and will not agree as stated in the summary that efforts to conclude a universal, unconditional, and legally binding instrument on security assurances to non-nuclear-weapon states should be pursued as a matter of priority.” This message foreshadowed Washington’s position at the 2005 conference, where it asserted that “the very real nuclear threats from NPT violators and non-state actors” eclipses the “relevance of non-use assurances.” An acrimonious debate about security assurances was among the reasons for the failed 2005 NPT review conference. The United States refused even to discuss them seriously at this conference or at its preparatory meetings, saying: [T]he end of the Cold War has further lessened the relevance of non-use assurances from the P-5 to the security of NPT [non-nuclear-weapon states], particularly when measured against the very real nuclear threats from NPT violators and non-state actors.… [L]egally binding assurances sought by the majority of states have no relation to contemporary threats to the NPT.[11] Options for the Next Administration Attempts to negotiate NSAs with the United States under the Bush administration seem impractical, but the next U.S. administration needs to take up the issue in time for the 2010 NPT review conference. As with the 1995 conference, the United States should lead a P-5 initiative prior to the 2010 conference to reaffirm political pledges not to use or threaten to use nuclear weapons against non-nuclear-weapon states. To build confidence in its nuclear intentions, it should allow the conference to establish a mechanism to consider ways to provide legally binding NSAs. In this regard, a new administration could consider several options. One option would be approval of another UN Security Council resolution going beyond the one adopted prior to the 1995 conference. Such a resolution of security assurances to NPT non-nuclear-weapon parties in full compliance with their obligations could include two key components. It could recognize that legally binding security assurances to non-nuclear-weapon NPT members in full compliance with their nonproliferation obligations would strengthen the nuclear nonproliferation regime and that the Security Council should consider taking action against any nation threatening to use nuclear weapons against a non-nuclear-weapon NPT member. Although the first of these two parts would go a long way to address the concerns of many states that the United States and the other nuclear-weapon NPT members have weakened their NSA promises, the second statement would address the security of non-nuclear-weapon NPT members not aligned with any of the P-5. In light of the Bush administration’s insistence that the 1995 U.S. assurances, offered essentially to gain support for the indefinite extension of the NPT and recognized by the Security Council, are not legally binding on the United States, and that these assurances do not preclude the United States from preemptory attacks upon underground hiding places for biological or chemical weapons, the solemn declarations made by the United States and other P-5 members are now regarded as of little value by these non-nuclear-weapon NPT members. Unless a post-2008 U.S. administration wins back the confidence of these nonaligned states that U.S nuclear policies are not aimed at them, any approach through the Security Council would be unappealing. Another step would be to offer guarantees to countries in nuclear-weapon-free zones outside of Latin America. Other existing zones include Africa, Central Asia, the South Pacific, and Southeast Asia. The United States has not yet committed itself legally not to attack or threaten to attack with nuclear weapons members of these zones. This leaves many to believe that the United States is keeping the nuclear option open even for states that have, in addition to their NPT non-nuclear-weapon state obligations, declared that their own and their neighbors’ territories must be free of nuclear weapons. A main driving force behind declaring these zones free of nuclear weapons is not to be threatened by states that have them. Nuclear-weapon-free zones play an important role in strengthening the security of states that belong to such zones, but these zones remain complementary instruments to the global nuclear nonproliferation norm: the NPT. Pending the total elimination of nuclear weapons, only the NPT provides the framework for global assurances against the threat or use of nuclear weapons. Because amendment of the NPT is almost impossible, legally binding assurances could be more effectively addressed in a separate treaty or, better yet, a protocol to the existing NPT. Honoring only those assurances given to members of existing nuclear-weapon-free zones would exclude countries not covered by these zones or by other nuclear security arrangements. A nuclear-weapon state could also provide unilateral security assurances to a non-nuclear-weapon state. This may be feasible in a few cases, but it could also send the wrong signal. North Korea has sought such a promise from the United States. If U.S.-North Korean negotiations produce such a promise, it should of course be conditioned on North Korea’s observance of its commitment not to acquire nuclear weapons and to give up any that it now has. Such a promise, however, could send a dangerous message: the only way to extract assurances from the United States against the threat or use of nuclear weapons is to seek such weapons first. If other states, such as Iran, use similar nuclear brinkmanship, the nonproliferation regime could be blown apart. Two other broader options could also be considered. One would be a new treaty containing promises by the P-5 not to use nuclear weapons against NPT-compliant non-nuclear-weapon members. Such a treaty has been proposed for negotiation at the Geneva-based Conference on Disarmament (CD). NPT outsiders India, Israel, and Pakistan, however, are active participants at this conference and would probably not agree to be excluded from the negotiations. At the same time, many non-nuclear-weapon states would be in principle opposed to accepting NSAs from these three nuclear-armed countries. In the eyes of NPT non-nuclear-weapon members, **why should nonmember states with nuclear weapons gain the benefits of a nuclear nonuse promise**? In addition, negotiating such a treaty in the CD would create yet another proliferation conundrum. Would Israel, which is a CD member, acknowledge its nuclear status and, as a result, be required to offer legally binding assurances to its Arab neighbors? Will its Arab neighbors accept Israel’s status and its offer? The answer to both questions is likely to be no. At the moment, the CD remains deadlocked over several issues, including whether to take up a Sri Lankan proposal that includes discussion of NSAs and possibly negotiation of such a treaty. The best option would probably be to negotiate a protocol to the NPT containing NSAs for all non-nuclear-weapon NPT members. The NAC submitted such a draft based on an earlier South African draft for consideration during the preparatory phase for the 2005 conference. The United States, however, categorically opposed it, and no serious negotiations on it resulted. A protocol to the NPT has the advantage of limiting the recipients of the promise to non-nuclear-weapon NPT members and thereby **providing a reward for joining and staying within the NPT**. Surely, security assurances should only be available to states that have forgone the nuclear weapons option. Non-NPT states-parties and NPT states-parties aspiring to acquire or develop nuclear weapons in contravention of the treaty **should not enjoy such security luxury**. Security assurances granted only to non-nuclear-weapon states in full compliance with their NPT nonproliferation obligations will **emphasize the basic principle that security is guaranteed by the NPT regime and not by nuclear weapons.** This would **strengthen** the regime and confirm the validity of the NPT and its **indefinite extension**. Legally binding security assurances linked to the NPT would also build confidence among NPT state-parties, addressing concerns over possible scenarios in which some nuclear-weapon states may consider using these arms.

### 1NC DA

#### Obama is winning but it will be close and it’s reversible – popularity is key

**Brownstein, 9/21/12** - a two-time finalist for the Pulitzer Prize for his coverage of presidential campaigns, is National Journal Group's Editorial Director, in charge of long-term editorial strategy.(Ronald, National Journal, “Heartland Monitor Poll: Obama Leads 50 Percent to 43 Percent” <http://www.nationaljournal.com/2012-presidential-campaign/heartland-monitor-poll-obama-leads-50-percent-to-43-percent-20120921?page=1>)

President Obama has opened a solid lead over Mitt Romney by largely reassembling the “coalition of the ascendant” that powered the Democrat to his landmark 2008 victory, the latest Allstate/National Journal Heartland Monitor Poll has found.

The survey found Obama leading Romney by 50 percent to 43 percent among likely voters, with key groups in the president’s coalition such as minorities, young people, and upscale white women providing him support comparable to their levels in 2008.

The survey, conducted by Ed Reilly and Jeremy Ruch of FTI Communications, a communications and strategic consulting firm, surveyed 1,055 likely voters by landline and cell phone from Sept. 15-19. It has a margin of error of plus or minus 3 percentage points. Full results from the survey, including a detailed look at Americans’ attitudes about opportunity and upward mobility, will be released in the Sept. 22 National Journal.

The Heartland Monitor’s results are in line with most other national surveys in recent days showing Obama establishing a measurable lead, including this week’s new Pew Research Center and NBC/Wall Street Journal polls. The saving grace for Republicans is that even as these surveys show Obama opening a consistent advantage, the president has not been able to push his support much past the critical 50 percent level, even after several difficult weeks for Romney that began with a poorly reviewed GOP convention. That suggests the president faces continued skepticism from many voters that could allow Romney to draw a second wind if he can stabilize his tempest-tossed campaign.

The poll found Obama benefiting from a small increase in optimism about the country’s direction. Among likely voters, 37 percent said the country was moving in the right direction. Even looking at all adults, the "right track" number now stands at 35 percent, its best showing since the April 2010 Heartland Monitor.

Obama’s approval rating in the new survey also ticked up to 50 percent, with 46 percent disapproving. That’s a slight improvement from May, when the survey of all adults found 47 percent approving and 48 percent disapproving. Among all adults, Obama’s rating improved to 49 percent approving and 45 percent disapproving, also one of his best showings since January 2010.

Those gains are critical, because as always with an incumbent president, attitudes toward Obama’s performance powerfully shape the race. Among likely voters who approve of Obama’s job performance, he leads Romney in the ballot test by 93 percent to 3 percent; those who disapprove prefer Romney by 87 percent to 5 percent.

#### Nuclear power is unpopular with the public – multiple reasons

Mariotte 12 – executive director and the chief spokesperson for NIRS, has testified in the United States Senate and before the U.S. House of Representatives on nuclear power, a graduate of Antioch College. (Michael, Jun 5th, “Nuclear Power and Public Opinion: What the polls say” http://www.dailykos.com/story/2012/06/05/1097574/-Nuclear-Power-and-Public-Opinion-What-the-polls-say) Jacome

These are all fundamental questions, the answers to which could affect our future far more than, say, who will be the next Senator from Indiana. Yet, perhaps surprisingly, until recently—really the past two or three years—other than regularly-conducted, loudly-trumpeted and rarely relevant industry-sponsored polls, polling of public opinion on nuclear power (and a lot of other energy issues) was haphazard at best.

Gallup, for example, over the past 18 years as best as we can find out, has conducted only 10 polls (and most of these only asked a half-sample, putting their numbers into question) asking people their opinion on nuclear power. But beginning in 2009, Gallup has begun polling annually. Unfortunately, Gallup asks the exact same question, with the same wording, that the Nuclear Energy Institute’s (NEI) own well-tested polling does. And the NEI doesn’t ask questions that it doesn’t want the answers to. Even so, Gallup’s answers don’t quite match those NEI gets, and which are usually heavily promoted in the media by NEI.

To try to get a better sense of what the public really thinks about nuclear power (and since we can’t afford to conduct our own polling), we took a look at every poll we could find on the issue, and related energy issues, over the past two years, and in some cases further back. Yes, that includes GOP/Fox News favorite Rasmussen.

As DailyKos readers know, if not the general public, examining all the possible polls leads to a much greater confidence in conclusions than relying on a single poll. Thus, we have a fairly strong confidence that our conclusions are a good statement of where the American public is at on nuclear power and our energy future in the Spring of 2012.

Conclusion 1: The public does NOT want to pay for new nuclear power. It IS willing to pay for renewable energy.

This one is a slam dunk.

New nuclear reactors are simply too expensive for utilities to build with their own assets. Nor are banks willing to lend money for most nuclear projects; they’re considered too risky given the long history of cost overruns, defaults, cancellations and other problems. Thus, the only two means of financing a new reactor are to either get money from taxpayers, through direct federal loans or taxpayer-backed loan guarantees, or from ratepayers in a few, mostly Southern states, which allow utilities to collect money from ratepayers before reactors are built—a concept known either as “early cost recovery” or Construction Work in Progress (CWIP).

ORC International (which polls for CNN, among others) has asked a straightforward question for the past two years (March 2011 and February 2012) in polls commissioned by the Civil Society Institute: “Should U.S. Taxpayers Take on the Risk of Backing New Nuclear Reactors?” The answer? Basically identical both years: 73% opposed in 2011, 72% opposed in 2012.

Maybe using the work “risk” skews the poll, you think? So ORC also asked, “Do you favor or oppose shifting federal loan guarantees from nuclear energy to clean renewables?” The answer was basically the same: 74% said yes in 2011, 77% in 2012 with 47% “strongly” holding that opinion both years.

A third poll conducted by ORC for Civil Society Institute in March 2012 asked this question:

“Utilities in some states are allowed to charge electricity ratepayers for “Construction Work in Progress” for new power plants. This means that ratepayers – instead of the companies – pay for construction of new nuclear reactors and other major power plants before any electricity ever reaches customers, thereby lowering the financial risks to shareholders. Knowing this, which of the following statements about “Construction Work in Progress” most closely reflects your view?”

The answer: fully 80% opposed CWIP.

Most pollsters have not asked similar questions; interestingly though, Rasmussen did in May 2012 for an undisclosed client. Their question: “The government is providing billions in loan guarantees to help the development of new nuclear plants. Would that money be better spent on the development of alternative new energy sources?” Unfortunately, Rasmussen did not publicize the results and hid them behind a paywall, which we were not inclined to pursue. But if anyone has access to that, we’d love to know what Rasmussen found.

Conclusion 2: Americans do not think nuclear power is “clean” energy, and still don’t want to pay for it.

Jumping back to ORC International, their March 2012 poll found this:

About two out of three Americans (66 percent) – including 58 percent of Republicans, 65 percent of Independents, and 75 percent of Democrats -- agree that the term “‘clean energy standard’ should not be used to describe any energy plan that involves nuclear energy, coal-fired power, and natural gas that comes from hydraulic fracturing, also known as ‘fracking.’”

and this:

About three out of four Americans (73 percent) agree that “federal spending on energy should focus on developing the energy sources of tomorrow, such as wind and solar, and not the energy sources of yesterday, such as nuclear power.” Fewer than one in four (22 percent) say that “federal spending on energy should focus on existing energy sources, such as nuclear, and not emerging energy sources, such as wind and solar.”

Meanwhile, the New York Times in May reported on a Harvard/Yale poll (also behind a paywall), conducted in 2011 but released in May 2012, that found that Americans are willing to pay an average of $162/year more for clean energy than they are paying now—an average 13% increase in electric bills. But when clean energy was defined as including nuclear power or natural gas, that support plummeted.

This is consistent with findings over the past decade, which have shown that nuclear power has typically ranked well below renewable energy sources, especially solar and wind, in public opinion, at times battling with coal for least-favorite U.S. energy source.

A March 2012 Gallup poll found that 69% of Americans support spending more government money on solar and wind power—with majorities among Democrats (84%) and Republicans (51%) alike. But support for “expanding the use of nuclear power” barely received a majority (52%) and then only due to Republican support: 64% of Republicans supported that idea, only 41% of Democrats.

Conclusion 3: On new reactors, how one asks the question matters.

Gallup and the Nuclear Energy Institute ask the same question: “Overall, do you strongly favor, somewhat favor, somewhat oppose or strongly oppose the use of nuclear energy as one of the ways to provide electricity in the U.S.?”

This question doesn’t really get to the issue of support for new nuclear reactors, although NEI typically tries to spin it that way. Although a question of support for current reactors wasn’t asked in any recent poll we saw, the public traditionally has been more supportive of existing reactors than new ones, and the question above could easily be interpreted as support for existing reactors, or even simple recognition that they exist. The results may also be skewed by the pollsters throwing nuclear in as “one of the ways,” without a context of how large a way.

Nonetheless, despite asking the same question, Gallup and NEI can’t agree on the answer. NEI, for example, in November 2011 asserted that 28% of the public strongly favors nuclear power with an additional 35% somewhat in favor. NEI found only 13% strongly opposed and another 21% somewhat opposed. A May 2012 NEI poll did not publicly break down the numbers into strongly vs somewhat, but claimed a similar 64-33% split between support for nuclear power and opposition.

Gallup, asking the same question in March 2012, found a narrower split. A smaller number was strongly in favor (23%, a drop of 5%) and a larger number strongly opposed (24%, increase of 3%)—overall an 8-point anti-nuclear swing among those with strong opinions. Those in the middle were 34% somewhat favor vs 16% somewhat opposed. The 2012 numbers were slightly worse for nuclear power than the identical question asked in March 2011, just before Fukushima.

But other polls suggest that Gallup and NEI may be asking the wrong question. For example, the LA Times reported on a Yale-George Mason University poll in April 2012 that found that support for new nuclear power had dropped significantly, from 61% in 2008 to 42% today.

Even Rasmussen in its May 2012 poll found that only 44% support building new reactors. That was good news for Rasmussen since it found that only 38% oppose them, with a surprising 18% undecided (surprising because no other poll we saw had such a high undecided contingent for any nuclear-related question).

Meanwhile the March 2012 ORC International poll found that:

“Nearly six in 10 Americans (57 percent) are less supportive of expanding nuclear power in the United States than they were before the Japanese reactor crisis, a nearly identical finding to the 58 percent who responded the same way when asked the same question one year ago. Those who say they are more supportive of nuclear power a year after Fukushima account for well under a third (28 percent) of all Americans, little changed from the 24 percent who shared that view in 2011.”

But perhaps the most telling, and easily the most interesting, poll comes from a March 2012 poll from the Yale Project on Climate Change Communications. Participants were asked, “When you think of nuclear power, what is the first word or phrase that comes to your mind?”

29% of those polled said “disaster.” Another 24% said “bad.” Only about 15% said “good” and that was the only measurable group that had anything positive to say. That poll also found that, “…only 47 percent of Americans in May 2011 supported building more nuclear power plants, down 6 points from the prior year (June 2010), while only 33 percent supported building a nuclear power plant in their own local area.”

Conclusions

Americans are not exactly wild about the idea of building new nuclear reactors. Polls asking the question different ways arrive at different results; at the lowest common denominator it is safe to say the country is divided on the issue. But Americans clearly don’t want to pay for construction of new reactors. And the reality is that no utility wants to or even can spend its own money building new reactors—they’re just too expensive. Congress, State legislatures and Public Service Commissions would do well to heed that warning, especially since it crosses all party and political lines.

#### Romney causes a strike on Iran

Robert W. Merry 8-1-2012; editor of The National Interest and the author of books on American history and foreign policyRomney Edges U.S. toward War with Iran <http://nationalinterest.org/commentary/romney-edges-us-toward-war-iran-7275>

The major newspapers all understood that GOP presidential candidate Mitt Romney’s expressions in Jerusalem last weekend were important, which is why they played the story on page one. But only the New York Times captured the subtle significance of what he said. The paper’s coverage, by Jodi Rudoren and Ashley Parker, reported that Romney sought to adhere to the code that says candidates shouldn’t criticize the president on foreign soil. “But,” they added, “there were subtle differences between what he said—and how he said it—and the positions of his opponent.” Most significantly, while Obama talks about stopping Iran from obtaining nuclear weapons, Israel insists Tehran should be prevented from having even the capacity to develop nuclear weapons. This means no nuclear development even for peaceful purposes. Romney embraced the Israeli language. In doing so, he nudged his nation closer to war with Iran. Based on Israeli prime minister Benjamin Netanyahu’s oft-repeated expressions, he clearly seems bent on attacking Iran to destroy or delay its nuclear program and, if possible, undermine the Iranian regime. And he wants America at his side when he does it. Obama has been seeking to dissuade Israel from contemplating such an assault in order to give the president’s austere sanctions regimen a chance to work. But what does he mean by “a chance to work?” If he means a complete capitulation by Iran, he’s dreaming, of course. History tells us that nations don’t respond to this kind of pressure by accepting humiliation. That’s the lesson of Pearl Harbor, as described in my commentary in these spaces. Many close observers of the Iran drama believe there may be an opportunity for a negotiated outcome that allows Iran to enrich uranium to a limited extent—say, 5 percent—for peaceful purposes. Iran insists, and most experts agree, that the Non-Proliferation Treaty allows such enrichment for energy production. In any event, numerous signatories to the NPT do in fact maintain limited enrichment programs for peaceful ends. Obama seems torn between pursuing such an outcome and embracing the Israeli position, which demands that Iran foreswear all enrichment and any peaceful nuclear development. In last spring’s Istanbul meeting between Iran and the so-called P5+1 group (the United States, Britain, France, China, Russia and Germany), there seemed to be a genuine interest on the part of those six nations to explore an outcome that would allow for some enrichment by Iran. Five weeks later in Baghdad, the P5+1 group seemed to backtrack and insist upon zero enrichment. Talks are ongoing but only among low-level technical people; any serious negotiations are on hold pending the election. Thus Obama has managed to maintain his flexibility during the delicate campaign period. But now we have Romney in Israel essentially telling the people there that they need fear no ambivalence on his part. If elected, he will embrace the Netanyahu position, which is designed to ensure the collapse of any negotiations attending anti-Iran sanctions, which Netanyahu already has labeled a failure. “We have to be honest,” he said over the weekend, during Romney’s visit, “and say that the sanctions and diplomacy so far have not set back the Iranian program by one iota.” That’s the view that Romney subtly embraced in Jerusalem.

#### Great power war

Trabanco 2009 – Independent researcher of geopolitical and military affairs (1/13/09, José Miguel Alonso Trabanco, “The Middle Eastern Powder Keg Can Explode at Anytime,” http://www.globalresearch.ca/index.php?context=va&aid=11762)

In case of an Israeli and/or American attack against Iran, Ahmadinejad's government will certainly respond. A possible countermeasure would be to fire Persian ballistic missiles against Israel and maybe even against American military bases in the regions. Teheran will unquestionably resort to its proxies like Hamas or Hezbollah (or even some of its Shiite allies it has in Lebanon or Saudi Arabia) to carry out attacks against Israel, America and their allies, effectively setting in flames a large portion of the Middle East. The ultimate weapon at Iranian disposal is to block the Strait of Hormuz. If such chokepoint is indeed asphyxiated, that would dramatically increase the price of oil, this a very threatening retaliation because it will bring **intense** financial and **economic havoc upon the West**, which is already facing significant trouble in those respects. In short, the necessary conditions for a major war in the Middle East are given. Such conflict could rapidly spiral out of control and thus a relatively minor clash could quickly and **dangerously escalate by engulfing the whole region** and perhaps even beyond. There are many key players: the Israelis, the Palestinians, the Arabs, the Persians and their respective allies and some **great powers could become involved** in one way or another (America, Russia, Europe, China). Therefore, any miscalculation by any of the main protagonists can trigger something no one can stop. Taking into consideration that the stakes are too high, perhaps it is not wise to be playing with fire right in the middle of a powder keg.

### 1NC DA

#### Uranium prices increasing now – rising demand

**Energy Report 9/13** [“Uranium Fundamentals Are at a Tipping Point: Alka Singh”, Business Insider 9/13/12]

Alka Singh: There are 433 currently operating nuclear power reactors around the world. Annually, they consume 177 million pounds (Mlb) of uranium. The world does not produce that much yellow cake. Last year, production was 130 Mlb. The gap is currently being filled largely by the Highly Enriched Uranium Agreement (HEU) with Russia and by other sources. As we approach the 2013 HEU Agreement expiry date, the supply/demand fundamentals will prove positive for uranium prices, and that will boost the price of uranium equities.¶ TER: Who has the pricing power in this market?¶ AS: When electrical power utilities buy uranium through long-term contracts, the agreements run as long as 8–10 years. That's why utilities have pricing power. The challenge now is that spot uranium prices are at $48 a pound (lb). But for many mines, the cost of production is $50–60/lb. The utilities have an enormous amount of power when it comes to determining the price of yellow cake. They are happy to sit on the sidelines and jump in to buy supply at basement prices. When spot prices compare favorably to the long-term prices, the utilities will buy supply from the short-term market. But, over time, the long-term prices determine where the market is heading.¶ TER: Globally, do state-owned energy utilities have a competitive advantage over the private utilities when it comes to obtaining uranium?¶ AS: Yes. Since state-owned utilities receive government backing for resources and loan guarantees, it's always easier for the public enterprises to be more successful. But, that is more so in developing countries, such as South Africa, than in the developed countries.¶ TER: How significant is military demand for uranium globally versus demand from electrical utilities?

#### And the plan links – “we don’t have to mine uranium at all for IFR Plants” that’s a quote from

**Kirsch 4** [Steve Kirsch, analyst, “The Integral Fast Reactor (IFR) project: Q&A”]

Q. How clean is an IFR plant? Does it emit any CO2?¶ IFRs don't put out any CO2 (although the employees exhale some). Usually people who make these arguments talk about how much¶ CO2 is released during uranium mining (none with IFRs), how much is released during construction (primarily from concrete production, which is responsible for 2-3% of CO2 emissions around the world but around 1% in the USA because we use less than most other countries compared to our other emitters), and how much is emitted from the vehicles used in the excavations, etc, as well as the amount emitted in the fabrication of the components. Of course these also apply to solar and wind generation facilities as well, don't they? Once our manufacturing facilities start running on electricity, and our vehicles start running on boron or, at the very least, carbon-neutral biofuels, then it'll be completely moot. This is one of those straw men tossed out there by anti-nuke people that doesn't hold water. The fact that we don't have to mine uranium at all for IFR plants kind of shoots it down in flames

#### High uranium prices are key to Kazakhstan’s nuclear ambitions – this saves the Kazakh economy and sheds its oil export overdependence.

**Kassenova 8** [Togzhan, Bulletin of Atomic Scientists, Apr 28, “Kazakhstan's nuclear ambitions”]

In conclusion, Kazakhstan's nuclear ambitions are likely to be realized if uranium prices stay high and Kazatomprom is successful in further expanding its international partners. Kazatomprom's most immediate task is to secure customers for its final nuclear fuel product--fuel assemblies, an extra fuel fabrication stage Kazatomprom plans to start carrying out domestically. Having a nearly complete nuclear fuel cycle--save for enrichment--will ensure a stable cash flow for Kazatomprom and limit its dependence on the fluctuating market price of raw uranium. In the meantime, though, increased uranium sales will help alleviate the country's overdependence on oil exports and help modernize its nuclear sector. If Kazakhstan does become the world's leading uranium and nuclear fuel supplier, the ramifications for the country both in terms of increased gross domestic product and status on the world stage will be profound. Nonetheless, Kazakhstan will remain heavily dependent on the export of its natural resources and on the vagaries of the commodities markets.

#### Kazakh economic and energy leadership is the linchpin to Central Asian stability.

**Frost 8** [Patrick, Foreign Policy Association, Nov 13, “Kazakhstan and the Financial Crisis]

Rustemov is correct in stating that this economic crisis may lead to following and connected geopolitical disruptions and he’s also right in arguing that regional and multilateral groups, such as the SCO and OSCE, will be crucial in helping the world get through this mess in one stable piece. Another important aspect of his comments is the positive role Kazakhstan can play in impacting the crisis in a productive way and that is in securing energy resources and in providing food stuffs to alleviate shortages in other countries, specifically in harder hit CA states, such as Kyrgyzstan, Tajikistan, and Afghanistan. Kazakhstan’s abundance of energy supplies, combined with President Nazarbayev’s prudent planning, have left the nation in good condition despite the tough times. Nazarbayev announced last month that the government would spend $2 billion to stimulate the economy, mainly targeting banks and the construction industry, funds drawn from the nation’s oil fund. Unfortunately, not all CA or world states have an oil fund to fall back on. What the whole of Central Asia can hope for is sturdy economic stewardship by its regional leader, Kazakhstan, and help from regional bodies, both from the East and West to weather what will most likely be a lengthy recession**. During this time, it will be vital to keep the region from falling into disrepair as poverty and extremism** would both be on the rise and this may lead to conflict. The US, Russia, China, and the EU all have roles to play in mitigating negative ramifications of this crisis in the region, but **a strong and active Kazakhstan is crucial**. As Muriel Mirak-Weissbach concludes: “Kazakhstan has become the foremost interlocutor in Central Asia, not only for Eurasian giants Russia and China, but also for the two major economies of western Europe, Germany and France. If the current world crisis can be overcome through participation of major Eurasian nations, **Kazakhstan can become the linchpin in the region for stability and security**.”

#### Nuclear war

**Blank 2k** [Stephen, Strategic Studies Institute Soviet Expert, “US military Engagement with Transcaucasia and Central Asia,” http://www.bits.de/NRANEU/docs /Blank2000.pdf]

In 1993 Moscow even threatened World War III to deter Turkish intervention on behalf of Azerbaijan. Yet the new Russo-Armenian Treaty and Azeri-Turkish treaty suggest that Russia and Turkey could be dragged into a confrontation to rescue their allies from defeat. 72 Thus many of the conditions for conventional war or protracted ethnic conflict in which third parties intervene are present in the Transcaucasus. For example, many Third World conflicts generated by local structural factors have a great potential for unintended escalation. Big powers often feel obliged to rescue their lesser proteges and proxies. One or another big power may fail to grasp the other side’s stakes since interests here are not as clear as in Europe. Hence commitments involving the use of nuclear weapons to prevent a client’s defeat are not as well established or apparent. Clarity about the nature of the threat could prevent the kind of rapid and almost uncontrolled escalation we saw in 1993 when Turkish noises about intervening on behalf of Azerbaijan led Russian leaders to threaten a nuclear war in that case. 73 Precisely because Turkey is a NATO ally, Russian nuclear threats could trigger a potential nuclear blow (not a small possibility given the erratic nature of Russia’s declared nuclear strategies). The real threat of a Russian nuclear strike against Turkey to defend Moscow’s interests and forces in the Transcaucasus makes the danger of major war there higher than almost everywhere else.

### 1NC CP

#### The United States federal government should approve a Lead-cooled Fast Reactor demonstration project in the United States.

#### IFRs are sodium cooled

**McFarlane 2** (Harold, PROLIFERATION RESISTANCE ASSESSMENT OF THE INTEGRAL FAST REACTOR, [www.ipd.anl.gov/anlpubs/2002/07/43534.pdf](http://www.ipd.anl.gov/anlpubs/2002/07/43534.pdf) )

The Integral Fast Reactor (IFR) concept includes a sodium-cooled fast reactor collocated with an integrated pyroprocess fuel recycling facility. The pyrochemical processes and the inert atmosphere of the heavily shielded fuel cycle facility provide inherent proliferation-resistant features for this advanced technology. The reactor can be designed to operate with a number of different conversion factors, so that it could be used for excess plutonium consumption or as a breeder if needed for rapid expansion of energy supply. The system contains a large quantity of plutonium and minor actinides, which at all times remain in extremely hostile environments and in chemical and physical forms that would require additional processing to extract weapons-suitable material. The aqueous processing equipment and facilities to accomplish such separation would not be available on site. Transportation would not be required in the reference deployment scenario. Nevertheless, the proliferation-resistance of some parts of the system could be considerably strengthened by advanced safeguards technologies. In spite of its inherent features, international deployment of the system would probably be limited to stable countries with a strong existing nuclear infrastructure. INTRODUCTION Assessing the proliferation resistance of Argonne National Laboratory’s Integral Fast Reactor (IFR) concept has been a relatively popular pastime activity for the past 16 years. [1,2,3,4,5] This particular assessment is based on the unpublished work that went into preparing a presentation for vthe Nuclear Energy Research Advisory Committee’s (NERAC) Special Committee on Technical Opportunities for Proliferation-resistant Systems (TOPS) [6]. Speculation on the proliferation resistance of the concept endures because the technology continues to develop and mature, the assessment tools improve, and the possibility of applying elements of IFR technology to national problems continues to be raised. As originally conceived [7], the Integral Fast Reactor comprised a fast-spectrum, sodium-cooled, metal-fuelled reactor and a collocated fuel recycling facility that employed pyroprocessing and fully remotized metal fuel casting and assembly. No transportation of nuclear materials would be required other than the initial shipment of fuel for startup. The system would be self-sustaining, i.e., producing as much plutonium as was consumed and lost to incidental waste streams. Because of the unique fuel cycle, plutonium would remain in a highly radioactive matrix at all times in facilities that were literally inaccessible to humans at all times. In designing the system during the post- International Nuclear Fuel Cycle Evaluation (INFCE) [8] era, robust proliferation resistance was a requirement. The fundamental assumption was that nuclear fuel recycle would be required and therefore the best approach to plutonium management was to avoid producing, storing or using it in any form that could be easily stolen or concealed, or that could be used without further refinement to fabricate a nuclear explosive. Furthermore, it was important that the process equipment and facilities could not be easily modified to produce a weapons-suitable product.

#### That risks leaks and accidents

Barton 8 (Charles, Department of Physics: University of York, Liquid Sodium Reactors , Thursday, March 27, 2008, <http://thoriumenergy.blogspot.com/2008/03/liquid-sodium-reactors.html> )

Weinberg did not comment on the safety of sodium cooled reactors on that occasion, but in a lecture delivered at Argonne National Laboratory ten years later, Weinberg observed: "We have no real estimates of accident probabilities for liquid metal fast breeder reactors (LMFBR’s). The Rasmussen estimate (one in 20,000 per reactor year with an uncertainty of five either way) would lead to a meltdown every 3 years. This is probably an unacceptable rate; an accident rate at least ten times lower, and possibly 100 times lower may be needed if the system is to be acceptable." Later in the same lecture Weinberg added, "the acceptable accident rate will probably have to be much lower than the Rasmussen report suggests. If one uncontained core meltdown per 100 years is acceptable (and we have no way of knowing what an acceptable rate really is), then the probability of such an accident will have to be reduced to about one in 1 million per reactor per year." The basic problem with sodium cooled reactors like the Liquid Metal Fast Breeder Reactor is the safety problem inherent in the use of sodium as a coolant. Sodium reacts chemically with both air and water, and will burn strongly with either. Hence sodium leaks become a significant issue with sodium cooled reactors. The history of sodium cooled reactors give scant comfort to those who argue that they are safe. Perhaps the best known Internet video related to reactor safety is the video of Japanese reactor workers responding to a sodium leak at the Monju Sodium cooled breeder reactor. The Monju reactor has been shutdown since the 1995 accident although reportedly the Japanese plan to reopen it this year. The Japanese were fortunate that the leak occurred in a secondary sodium coolant system, and that no radiation was leaked, however the danger of working with sodium are best illustrated by a 1996 attempt by Japanese researchers to recreate the conditions that lead to the Monju accident. Researchers concluded that the liquid sodium released during the accident, could have melted steel doors, and come into contact with a cement floor. A reaction between the liquid sodium and water in the cement would have caused a violent explosion. What would have happen next is not reported but the leaked sodium was not the only sodium that could have potentially been involved in the accident. Not only does primary coolant sodium burn easily in contact with air, it is also highly radioactive.

#### Extinction

**Mcpherson 11**—Prof. of natural resources @ the University of Arizona (w/ 10 books & over 100 papers & articles) (Guy, above, 11/9/11, “Three paths to near-term human extinction,” http://transitionvoice.com/2011/11/three-paths-to-near-term-human-extinction/, alp)

Safely shuttering a nuclear power plant requires a decade or two of careful planning. Far sooner, we’ll complete the ongoing collapse of the industrial economy. This is a source of my nuclear nightmares. When the world’s 443 nuclear power plants melt down catastrophically, we’ve entered an extinction event. Think clusterfukushima, times 400 or so. Ionizing radiation could, and probably will, destroy every terrestrial organism and, therefore, every marine and freshwater organism. That, by the way, includes the most unique, special, intelligent animal on Earth. You’ve been warned repeatedly in this space, and the Guardian finally joins the party: The industrial economic system is about to blow. This burst of hope, our remaining chance at salvation, will undoubtedly be greeted with the usual assortment of protests, ridicule, and hate mail I’ve come to expect from planetary consumers who want to keep consuming the planet.

#### That turns any investment in nuclear power

Caldicott 6 – Founder and President of the Nuclear Policy Research Institute (Helen, Nuclear Power is not the answer, pg. ix)

Nuclear power is exorbitantly expensive, and notoriously unreliable. Wall Street is deeply reluctant to re-involve itself in any nuclear investment, despite the fact that in the 2005 Energy Bill the U.S. Congress allocated $13 billion in subsidies to revive a moribund nuclear power industry. To compound this problem, the global supplies of usable uranium fuel are finite. If the entire world's electricity production were replaced today by nuclear energy, there would be less than nine more years of accessible uranium. But even if certain corporate interests are convinced that nuclear power at the moment might be a beneficial investment, one major accident at a nuclear reactor that induces a meltdown would destroy all such investments and signal the end of nuclear power forever.

#### Lead-cooled fast reactors solve all the turns

Tucek et al 5 (Kamil Tucek, Johan Carlsson, Hartmut Wider, Joint Research Centre of the European Commission, 13th International Conference on Nuclear Engineering, Beijing, China, May 16-20, 2005, nucleartimes.jrc.nl/Doc/ICONE13-50397.pdf

The tight pin lattice SFRs (P/D=1.2) showed to have a better neutron economy than wide channel LFRs (P/D=1.8), resulting in larger BOL actinide inventories and lower burn-up swings for LFR. The reactivity burn-up swing of LFR selfbreeder could be limited to 3$ in 3 years. The calculations revealed that LFRs have an advantage over SFRs in coping with the investigated severe accident initiators (ULOF, TLOP). The reason is better natural circulation behavior of LFR system and much higher boiling temperature of lead. An unprotected Loss-of-Flow accident in LFR leads to only a 250 K coolant outlet temperature increase whereas in SFR coolant would boil. Regarding the economics, the LFR seems to have an advantage since it does not require an intermediate coolant circuit. However, it was also proposed to avoid an intermediate coolant circuit in an SFR by using a supercritical CO2 Brayton cycle.

## 1NC Leadership f/l

### AT: Prolif

**IFRs won’t solve prolif– cheaters gonna cheat**

**Green 10** [“NUCLEAR WEAPONS, NUCLEAR POWER & INTEGRAL FAST REACTORS Friends of the Earth, Australia www.foe.org.au/anti-nuclear February 2010 Contact: Jim Green”, khirn]

The IFR concept – e.g. destroying nuclear waste and fissile (weapons) material and producing electricity in the process. In practice, there's every likelihood they would be problematic. Nuclear engineer Dave Lochbaum from the Union of Concerned Scientists has summed up the dilemma: "The IFR looks good on paper. So good, in fact, that we should leave it on paper. For it only gets ugly in moving from blueprint to backyard." The main problem is that the **claims made about the proliferation resistance of IFRs are overblown**. George Stanford, who worked on an IFR R&D program in the US, notes that proliferators "could do [with IFRs] what they could do with any other reactor − operate it on a special cycle to produce good quality weapons material." It may be easy to use an IFR to produce weapons materials (e.g. inserting and irradiating uranium targets) or it may be difficult – but it is certainly possible. IFR advocates assume that IFRs will be run on a normal operating cycle such that they would produce low-grade, highly-contaminated plutonium which would be contained within an intensely radioactive and intensely hot mixture that would greatly frustrate proliferators. But a proliferator would simply operate the reactor on a short irradiation cycle, producing weapon grade plutonium contained in a mixture which is not nearly so radioactive or hot. Likewise,IFR advocates claim that exceptionally heavily-shielded reprocessing facilities would be required to separate the plutonium because of the intense radioactivity and heat – but again they're making **the implausible assumption that a proliferator would run the reactor on a normal operating cycle.**

#### Proliferation is not going to happen

Alison 10 – Director at the Belfer Center for Science and International Affairs (Graham, Foreign Affairs, "Nuclear Disorder: Surveying Atomic Threats", <http://belfercenter.ksg.harvard.edu/publication/19819/nuclear_disorder.html>,)

After listening to a compelling briefing for a proposal or even in summarizing an argument presented by himself, Secretary of State George Marshall was known to pause and ask, "But how could we be wrong?" In that spirit, it is important to examine the reasons why the nonproliferation regime might actually be more robust than it appears. Start with the bottom line. There are no more nuclear weapons states now than there were at the end of the Cold War. Since then, one undeclared and largely unrecognized nuclear weapons state, South Africa, eliminated its arsenal, and one new state, North Korea, emerged as the sole self-declared but unrecognized nuclear weapons state.  One hundred and eighty-four nations have forsworn the acquisition of nuclear weapons and signed the NPT. At least 13 countries began down the path to developing nuclear weapons with serious intent, and were technologically capable of completing the journey, but stopped short of the finish line: Argentina, Australia, Brazil, Canada, Egypt, Iraq, Italy, Libya, Romania, South Korea, Sweden, Taiwan, and Yugoslavia. Four countries had nuclear weapons but eliminated them: South Africa completed six nuclear weapons in the 1980s and then, prior to the transfer of power to the postapartheid government, dismantled them. Belarus, Kazakhstan, and Ukraine together inherited more than 4,000 strategic nuclear weapons when the Soviet Union dissolved in December 1991. As a result of negotiated agreements among Russia, the United States, and each of these states, all of these weapons were returned to Russia for dismantlement. Ukraine's 1,640 strategic nuclear warheads were dismantled, and the highly enriched uranium was blended down to produce low-enriched uranium, which was sold to the United States to fuel its nuclear power plants. Few Americans are aware that, thanks to the Megatons to Megawatts Program, half of all the electricity produced by nuclear power plants in the United States over the past decade has been fueled by enriched uranium blended down from the cores of nuclear warheads originally designed to destroy American cities. Although they do not minimize the consequences of North Korea's or Iran's becoming a nuclear weapons state, those confident in the stability of the nuclear order are dubious about the prospects of a cascade of proliferation occurring in Asia, the Middle East, or elsewhere. In Japan, nuclear neuralgia has deep roots. The Japanese people suffered the consequences of the only two nuclear weapons ever exploded in war. Despite their differences, successive Japanese governments have remained confident in the U.S. nuclear umbrella and in the cornerstone of the United States' national security strategy in Asia, the U.S.-Japanese security alliance. The South Koreans fear a nuclear-armed North Korea, but they are even more fearful of life without the U.S. nuclear umbrella and U.S. troops on the peninsula. Taiwan is so penetrated and seduced by China that the terror of getting caught cheating makes it a poor candidate to go nuclear. And although rumors of the purchase by Myanmar (also called Burma) of a Yongbyon-style nuclear reactor from North Korea cannot be ignored, questions have arisen about whether the country would be able to successfully operate it.  In the Middle East, it is important to separate abstract aspirations from realistic plans. Few countries in the region have the scientific and technical infrastructure to support a nuclear weapons program. Saudi Arabia is a plausible buyer, although the United States would certainly make a vigorous effort to persuade it that it would be more secure under a U.S. nuclear umbrella than with its own arsenal. Egypt's determination to acquire nuclear weapons, meanwhile, is limited by its weak scientific and technical infrastructure, unless it were able to rent foreign expertise. And a Turkish nuclear bomb would not only jeopardize Turkey's role in NATO but also undercut whatever chances the country has for acceding to the EU.  Looking elsewhere, Brazil is now operating an enrichment facility but has signed the Treaty of Tlatelolco, which outlaws nuclear weapons in Latin America and the Caribbean, and has accepted robust legal constraints, including those of the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials. Other than South Africa, which retains the stockpile of 30 bombs' worth of highly enriched uranium that was once part of its nuclear program, it is difficult to identify other countries that might realistically become nuclear weapons states in the foreseeable future.

#### No Prolif and at worst its slow – management issues

**Hymans 12** – is Associate Professor of International Relations at the University of Southern California (Jacques, May/June, “Botching the Bomb” <http://www.foreignaffairs.com/articles/137403/jacques-e-c-hymans/botching-the-bomb>) Jacome

[NUCLEAR DOGS THAT HAVE NOT BARKED](http://web.ebscohost.com.ezproxy.library.wisc.edu/ehost/detail?vid=3&hid=8&sid=7585163c-914e-4787-9fd6-b2e36f800b43%40sessionmgr12&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#toc)

"TODAY, ALMOST any industrialized country can produce a nuclear weapon in four to five years," a former chief of Israeli military intelligence recently wrote in The New York Times, echoing a widely held belief. Indeed, the more nuclear technology and know-how have diffused around the world, the more the timeline for building a bomb should have shrunk. But in fact, rather than speeding up over the past four decades, proliferation has gone into slow motion.

Seven countries launched dedicated nuclear weapons projects before 1970, and all seven succeeded in relatively short order. By contrast, of the ten countries that have launched dedicated nuclear weapons projects since 1970, **only three have achieved a bomb**. And only one of the six states that failed -- Iraq -- had made much progress toward its ultimate goal by the time it gave up trying. (The jury is still out on Iran's program.) What is more, even the successful projects of recent decades have needed a long time to achieve their ends. The average timeline to the bomb for successful projects launched before 1970 was about seven years; the average timeline to the bomb for successful projects launched after 1970 has been about 17 years.

International security experts have been unable to convincingly explain this remarkable trend. The first and most credible conventional explanation is that the Nuclear Nonproliferation Treaty (NPT) has prevented a cascade of new nuclear weapons states by creating a system of export controls, technology safeguards, and on-site inspections of nuclear facilities. The NPT regime has certainly closed off the most straightforward pathways to the bomb. However, the NPT became a formidable obstacle to would-be nuclear states only in the 1990s, when its export-control lists were expanded and Western states finally became serious about enforcing them and when international inspectors started acting less like tourists and more like detectives. Yet the proliferation slowdown started at least 20 years before the system was solidified. So the NPT, useful though it may be, cannot alone account for this phenomenon.

A second conventional explanation is that although the NPT regime may not have been very effective, American and Israeli bombs have been. Syria's nascent nuclear effort, for instance, was apparently dealt a major setback by an Israeli air raid on its secret reactor construction site in 2007. But the record of military strikes is mixed. Contrary to the popular myth of the success of Israel's 1981 bombing of the Osiraq reactor in Iraq, the strike actually spurred Iraqi President Saddam Hussein to move beyond vague intentions and commit strongly to a dedicated nuclear weapons project, which lasted until the 1990-91 Gulf War. Moreover, the bombs that the United States dropped on Iraq during that conflict mostly missed Saddam's nuclear sites.

Finally, some analysts have asserted that nuclear weapons projects become inefficient due to political leaders' flagging levels of commitment. But these analysts are reversing cause and effect: leaders lose interest when their nuclear programs are not running well. And some nuclear weapons projects, such as France's, have performed well despite very tepid support from above. The imperfect correlation between the commitment of leaders and the quality of nuclear programs should not be surprising, for although commentators may speak casually of "Mao's bomb" or "Kim Jong Il's bomb," the real work has to be carried out by other people.

[ARRESTED DEVELOPMENT](http://web.ebscohost.com.ezproxy.library.wisc.edu/ehost/detail?vid=3&hid=8&sid=7585163c-914e-4787-9fd6-b2e36f800b43%40sessionmgr12&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#toc)

A MORE CONVINCING explanation of the proliferation slowdown begins with the observation that during the early days of the nuclear age, most states with nuclear ambitions were in the developed world, whereas since the mid-1960s, most would-be nuclear states have been in the developing world. As proliferation has become a mainly developing-world phenomenon, timelines to the bomb have slowed down dramatically. But the relevant difference here is not primarily economic. Some nuclear programs in very poor states have fared rather well, such the one undertaken by famine-stricken China in the 1950s and 1960s. Conversely, wealthy oil states, such as Iraq and Libya, spent vast amounts on decades-long nuclear quests but still failed.

National income is only one dimension of development, however, and in this case it is not the most important one. As the political scientist Francis Fukuyama has stressed, despite strong rates of economic growth, most developing countries struggle to establish high-quality state bureaucracies. And a dysfunctional bureaucracy is likely to produce a dysfunctional nuclear weapons project.

Nuclear research and development organizations depend heavily on intense commitment, creative thinking, and a shared spirit of cooperation among large numbers of highly educated scientific and technical workers. To elicit this positive behavior, management needs to respect their professional autonomy and facilitate their efforts, and not simply order them around. Respect for professional autonomy was instrumental to the brilliant successes of the earliest nuclear weapons projects. Even in Stalin's Soviet Union, as the historian David Holloway has written, "it is striking how the apparatus of the police state fused with the physics community to build the bomb.… [The physics community's] autonomy was not destroyed by the creation of the nuclear project. It continued to exist within the administrative system that was set up to manage the project."

By contrast, most rulers of recent would-be nuclear states have tended to rely on a coercive, authoritarian management approach to advance their quest for the bomb, using appeals to scientists' greed and fear as the primary motivators. That coercive approach is a major mistake, because it produces a sense of alienation in the workers by removing their sense of professionalism. As a result, **nuclear programs lose their way**. Moreover, underneath these bad management choices lie bad management cultures. In developing states with inadequate civil service protections, every decision tends to become politicized, and state bureaucrats quickly learn to keep their heads down. Not even the highly technical matters faced by nuclear scientific and technical workers are safe from meddling politicians. The result is precisely the reverse of what the politicians intend: not heightened efficiency but rather a mixture of bureaucratic sloth, corruption, and endless blame shifting.

Although it is difficult to measure the quality of state institutions precisely, the historical record strongly indicates that the more a state has conformed to the professional management culture generally found in developed states, the less time it has needed to get its first bomb and the lower its chances of failure. Conversely, the more a state has conformed to the authoritarian management culture typically found in developing states, the more time it has needed to get its first bomb and the **higher its chances of failure.**

#### **Deterrence solves the impact**

Colby 7 – Adjunct Staff Member of the RAND Corporation, formerly a staff member in the Office of the Director of National Intelligence and on the Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction (Eldridge, “Restoring Deterrence,” Orbis, Vol. 51, No. 3, p. 413-428, <http://www.theatlantic.com/past/docs/images/issues/200707u/Restoring%20Deterrence.pdf>)

This logic’s bottom line seems clear. If the proliferation of weapons technology is inevitable, then it hardly makes sense to embark on a quixotic crusade to prevent it. Better to accept the new reality and deal with it as best we can. Seen in this light, deterrence is quite appealing. Such a posture, accepting the inevitability of proliferation, would state as a policy only that the use (or allowance of use) of such weapons against the United States or its allies would provoke a devastating response. Countries could, if they wanted, develop these weapons, but the United States would take little strategic cognizance of them. There would be some strategic downside—regime change, for instance, would lose luster as a policy. But, overall, the weapons would have little effect if America maintained a basically status quo posture, defending its established interests and allies. If, for instance, Iran rattled its nuclear saber and insisted the United States withdraw from Saudi Arabia, we would have to play the brinksmanship game and not back down—but what would be new about that? And would Iran be so foolish as to do something to call down the wrath of the American retaliatory capability? Those who say so need do more than point to the rantings of Ahmadinejad. History has shown many enemies who poured scorn on a nuclear-armed United States, but none who were foolish enough actually to act on their bluster and thereby incur its full wrath. Further, Iran is hardly the Soviet Union of the Khrushchev era, bristling with nuclear and conventional weapons.

Indeed, a deterrent posture would, through not placing as much value on WMD, help the cause of disarmament by positively disincentivizing countries from developing them. If the U.S. took an agnostic position on the development of unconventional weapons, but maintained its same status quo red lines while demanding strict accountability for the use or loss of such weapons, why would countries want to build them? If North Korea’s nuclear weapons, in other words, will not affect the American commitment to South Korea (if the South Koreans don’t wreck it themselves in the meantime) and Japan, and if the United States holds the North Koreans responsible for whatever uses their nuclear weapons are put to, then is not the danger of possessing them greater than their beneﬁt? After all, these rogue states are not building these weapons to win a war against us. Instead, they are developing them either as last-ditch weapons—in which case we have no reason to push them into a corner anyway—or as cards to bluff with—in which case we simply need to call that bluff.

### AT: Competitiveness

#### Dominance is inevitable

Price 10 – Miller-McCune Magazine,(Tom, 3/13 “U.S. Challenged for High-Tech Global Leadership,” http://www.miller-mccune.com/science-environment/u-s-challenged-for-high-tech-global-leadership-10818/

Despite negative trends, U.S. R&D continues to lead the world by a **large margin**. In 2007, America’s $369 billion R&D spending exceeded all of Asia’s $338 billion and all of the European Union’s $263 billion. The United States spent more than the next four countries — Japan, China, Germany and France — **combined**.

America’s share of all high-tech manufacturing has risen — and it continues to lead the world — even though the U.S. share of exports has declined. That’s because the United States consumes so much of its product domestically. The United States makes nearly a third of the world’s high-tech goods, compared with the European Union’s 25 percent and China’s 14 percent. It’s the world leader in communications, semiconductors, pharmaceuticals and aerospace. It trails only the EU in scientific instruments and China in computers.

U.S. inventors obtained 81,000 U.S. patents in 2008, more than double Japan’s 35,000 and all of Europe’s 23,000. America’s 49 percent share of those patents dropped from 55 percent in 1995.

U.S. inventors also led in what the report calls “high-value” patents — those that were given protection by the EU and Japan as well as by the United States. The U.S. share of 30 percent was down from 34 percent in 1997.

**China obtained just about 1 percent of both kinds of patents.** But its scientists have become the second-most-prolific contributors to scholarly journals, another area in which the United States continues to lead the world.

The globalization of science is illustrated by the worldwide growth in many measures of scientific prowess, no matter which countries dominate, the board said. For example, high-tech exports more than tripled to $2.3 trillion worldwide between 1995 and 2008. The estimated number of researchers increased to 5.7 million in 2007 from 4 million in 1995. Global R&D expenditures totaled $1.1 trillion in 2007, up from $525 billion in 1996. Cross-boarder co-authorship also increased from 8 percent of scientific articles published in 1988 to 22 percent in 2007.

**Foreign corporations actually invested more in U.S.-based research** ($34 billion) in 2006 **than U.S. firms invested overseas** $28.5 billion. Both more than doubled since 1995.

#### Spending is irrelevant – culture guarantees competitiveness

**Segal 11** – senior fellow at CFR,—Ira A. Lipman senior fellow for counterterrorism and national security studies at the Council on Foreign Relations (Adam, 27 July 2011, “The Great Invention Race,” http://www.foreignpolicy.com/articles/2011/01/27/the\_great\_invention\_race, RBatra)

U.S. President Barack Obama's plan to "win the future" by out-innovating the rest of the world was a ringing climax of his State of the Union address this week. Obama suggested increasing U.S. investment in research and development, a good and welcome step. But what will really determine U.S. competitiveness in the global ideas market isn't the money we can pour into the system. It's the strength of the system itself -- the social, political, and cultural institutions that shape ideas from start to finish.

There is no doubt that China and India are catching up with the United States when it comes to hardware -- the raw materials for innovation. They are increasing their spending on science and technology, training more engineers and scientists, applying for more patents, and churning out more research papers.

**But the actual system for generating useful ideas in these places remains underdeveloped.** Yes, more scientists are being trained, but that doesn't mean they're producing good science. Plagiarism and data fraud are rampant. In a survey of 180 graduates with doctorates quoted in China Daily, 60 percent admitted to paying for their work to be published in academic journals. Sixty percent also said that they had copied someone else's work. Even as a large number of Chinese and Indian scientific stars have returned to their native countries from abroad, they have been unable to transform a research culture characterized by strong bureaucratic control and deference toward age and seniority. In the words of Anita Mehta, a physicist at the S. N. Bose National Centre for Basic Sciences in India, "Diversity of research or personality is often frowned upon, those who don't match stereotypes or work on subjects that have been hammered to death are labelled 'too independent.'"

In the Indian and Chinese private sectors, there are very real bursts of entrepreneurial activity. But government incentives, especially in China, are focused on making Chinese versions of international products such as cell phones and semiconductors rather than on sparking bold, local innovation. In both countries, new companies must maneuver through an opaque legal system, unpredictable regulations, and volatile capital markets. And though policymakers in Beijing and Delhi are aware of these challenges, addressing them will require political and social change, and so **progress will be slow and uneven.**

America can't win the hardware race. There are simply too many people -- 2.3 billion people in India and China -- for the United States to compete when it comes to materials and labor. Given respective population size, China and India will one day have more skilled engineers than the United States, even if their quality doesn't match up now. Total U.S. spending on R&D ($395 billion in 2010) is currently more than two and a half times larger than Chinese expenditures ($141 billion), but that gap is rapidly shrinking.

But America can compete when it comes to software -- i.e., the ideas and innovation that are still out of reach for China's and India's more hidebound scientific and business communities. An important first step will be helping small start-ups. Small companies (those with fewer than 500 employees) generate about half of total employment in the United States; according to the Small Business Technology Council, they also employ more scientists and engineers than do large businesses and more than universities and federal labs combined. Specifically, as a recent study by the Kauffman Foundation shows, new small businesses are the ones creating these jobs. Since 1980 nearly all net job creation in the United States occurred in firms less than five years old; over the last four years, these young start-ups created two-thirds of all new jobs.

To help small businesses, the U.S. government needs what William Miller, former vice president and provost of Stanford University and a venture capitalist, describes as "people and place" policies -- policies that support research, training, and collaboration. The Clinic Program at Harvey Mudd College, for example, involves students in solving real-world problems that have immediate commercial or scientific applications. The locus of innovation isn't in individual entities anymore -- universities, for example, or corporate labs -- but in broader ecosystems that combine these more traditional bodies with smaller networked groups. Another transformative example is in Maine, where the North Star Alliance Initiative -- a partnership involving small companies, the University of Maine, community colleges, and the state government -- is leveraging local research to spur the development of a wide range of other industries, including marine and waterfront infrastructure and ballistic armor.

A more holistic model of education will also be crucial. So far, unfortunately, the dominant U.S. policy response to this perceived global competition has been a single-minded focus on increasing the absolute number of scientists. Instead, the United States must think more broadly about the range of skills a scientist develops. Many future breakthroughs are likely to emerge from multidisciplinary work at the nexus of biology, physics, computer science, and mathematics. As a result, young entrepreneurs must be familiar with several different branches of the sciences, as well as be able to draw insights from design, psychology, economics, and anthropology.

Finally, the United States still retains the immense advantage of its connections with global innovation networks. A vast web of collaborative research, corporate alliances, foundation grants, personal ties, alumni groups, and government-to-government contacts tie the United States to established and emerging centers of scientific excellence. In 2005, for example, scientists in the United States were the most popular partners for Chinese and Japanese scientists in every field -- chemistry, physics, engineering, environmental technology, and biology -- but one: material science. And in that field, they were the second most popular choice for both their Japanese and their Chinese colleagues.

The goal, then, is to make sure the United States does not become complacent about these relationships. As the president noted in his State of the Union address, the United States must improve visa regulations, welcome highly skilled immigrants, and create clear paths to citizenship. Those who excel in school or start their own businesses should be encouraged to stay in the United States. At the same time, the United States will have to do more to reach out into the world. The National Science Foundation, the Department of Energy, and the National Institutes of Health, for example, should develop programs that provide more international experiences for U.S. scientists -- and not just short trips, but extended sojourns in foreign labs.

Inevitably, more science and scientific discovery will occur abroad in the coming years. But as long as the United States maintains its comparative advantage -- an open and flexible culture and a web of institutions, attitudes, and relationships that move ideas from the lab to the marketplace -- **there's no reason why the future isn't in its grasp**.

#### They are just wrong – it’s not a zero sum game – downstream development means our competitiveness will still be high

**Bhide 08** – Professor at Harvard School of Government (Amar, Nov 1, 2008 , “Is the U.S. Losing Its Economic Edge?”, <http://www.inc.com/magazine/20081101/q-is-the-us-losing-its-economic-edge_pagen_2.html>) Jacome

You write that the dire predictions of so-called techno-nationalists are misplaced. Who are these techno-nationalists, and what are they missing?

These are people who, in the context of trade and globalization, think that protectionism is bad, but that in order for us to survive the "onslaught of competition" from China and India, we have to crank up our technological investments so that we continuously stay ahead. These people say, let's invest more in R&D, let's invest more in basic research, let's train more engineers -- on the premise that the greater the technological lead that you have vis-à-vis other nations, the more prosperous you're going to be.

And that's wrong?

Absolutely. The U.S. isn't locked into a winner-take-all race for scientific and technological leadership with other nations. What's more, the growth of research capabilities in China and India, and thus their share of cutting-edge research, does not reduce U.S. prosperity. My analysis suggests exactly the opposite. Advances abroad will help improve living standards in the U.S. Moreover, the benefits I identify aren't the usual ones of how prosperity abroad increases opportunities for U.S. exporters. I show how cutting-edge research developed abroad benefits domestic production and consumption.

That's counterintuitive for most people.

It's helpful to think of a specific example. The World Wide Web was invented by a British scientist living in [Switzerland](http://www.inc.com/topic/Switzerland). Think of how much this invention in Switzerland has revolutionized lives in the U.S. and has improved U.S. prosperity, probably to a greater degree than it has in Switzerland and certainly to a greater degree than it has in most other parts of the world. Why? Because the U.S. is really good at taking things like the Web and weaving them into our commercial fabric. Or, to give you another popular example: Many of the high-level technologies associated with the iPod were developed outside the U.S. Compression software comes from [Germany](http://www.inc.com/topic/Germany); the design of the chip comes from the [U.K.](http://www.inc.com/topic/United+Kingdom) The whole idea of an MP3 player comes out of [Singapore](http://www.inc.com/topic/Singapore). But most of the value has been captured in the U.S., because the U.S. happens to represent the majority of the use of MP3 players in the world.

#### Heg inevitable

**Friedman** **10 –** American political scientist and author. He is the founder, chief intelligence officer, financial overseer, and CEO of the private intelligence corporation Stratfor. He has authored several books (George, “The Next 100 Years” p 13-31)

We are now in an America- centric age. To understand this age, we must understand the United States, not only because it is so powerful but because its culture will permeate the world and deﬁne it. Just as French culture and British culture were deﬁnitive during their times of power, so American culture, as young and barbaric as it is, will deﬁne the way the world thinks and lives. So studying the twenty- ﬁrst century means studying the United States. If there were only one argument I could make about the twenty- ﬁrst century, it would be that the European Age has ended and that the North American Age has begun, and that North America will be dominated by the United States for the next hundred years. The events of the twentyﬁrst century will pivot around the United States. That doesn’t guarantee that the United States is necessarily a just or moral regime. It certainly does not mean that America has yet developed a mature civilization. It does mean that in many ways the history of the United States will be the history of the twenty- ﬁrst century. There is a deep- seated belief in America that the United States is approaching the eve of its destruction. Read letters to the editor, peruse the Web, and listen to public discourse. Disastrous wars, uncontrolled deﬁcits, high gasoline prices, shootings at universities, corruption in business and government, and an endless litany of other shortcomings—all of them quite real—create a sense that the American dream has been shattered and that America is past its prime. If that doesn’t convince you, listen to Europeans. They will assure you that America’s best day is behind it. The odd thing is that all of this foreboding was present during the presidency of Richard Nixon, together with many of the same issues. There is a continual fear that American power and prosperity are illusory, and that disaster is just around the corner. The sense transcends ideology. Environmentalists and Christian conservatives are both delivering the same message. Unless we repent of our ways, we will pay the price—and it may be too late already. It’s interesting to note that the nation that believes in its manifest destiny has not only a sense of impending disaster but a nagging feeling that the country simply isn’t what it used to be. We have a deep sense of nostalgia for the 1950s as a “simpler” time. This is quite a strange belief. With the Korean War and McCarthy at one end, Little Rock in the middle, and Sputnik and Berlin at the other end, and the very real threat of nuclear war throughout, the 1950s was actually a time of intense anxiety and foreboding. A widely read book published in the 1950s was entitled The Age of Anxiety. In the 1950s, they looked back nostalgically at an earlier America, just as we look back nostalgically at the 1950s. American culture is the manic combination of exultant hubris and profound gloom. The net result is a sense of conﬁdence constantly undermined by the fear that we may be drowned by melting ice caps caused by global warming or smitten dead by a wrathful God for gay marriage, both outcomes being our personal responsibility. American mood swings make it hard to develop a real sense of the United States at the beginning of the twentyﬁrst century. But the fact is that the United States is stunningly powerful. It may be that it is heading for a catastrophe, but it is hard to see one when you look at the basic facts. Let’s consider some illuminating ﬁgures. Americans constitute about 4 percent of the world’s population but produce about 26 percent of all goods and services. In 2007 U.S. gross domestic product was about $14 trillion, compared to the world’s GDP of $54 trillion—about 26 percent of the world’s economic activity takes place in the United States. The next largest economy in the world is Japan’s, with a GDP of about $4.4 trillion—about a third the size of ours. The American economy is so huge that it is larger than the economies of the next four countries combined: Japan, Germany, China, and the United Kingdom. Many people point at the declining auto and steel industries, which a generation ago were the mainstays of the American economy, as examples of a current deindustrialization of the United States. Certainly, a lot of industry has moved overseas. That has left the United States with industrial production of only $2.8 trillion (in 2006): the largest in the world, more than twice the size of the next largest industrial power, Japan, and larger than Japan’s and China’s industries combined. There is talk of oil shortages, which certainly seem to exist and will undoubtedly increase. However, it is important to realize that the United States produced 8.3 million barrels of oil every day in 2006. Compare that with 9.7 million for Russia and 10.7 million for Saudi Arabia. U.S. oil production is 85 percent that of Saudi Arabia. The United States produces more oil than Iran, Kuwait, or the United Arab Emirates. Imports of oil into the country are vast, but given its industrial production, that’s understandable. Comparing natural gas production in 2006, Russia was in ﬁrst place with 22.4 trillion cubic feet and the United States was second with 18.7 trillion cubic feet. U.S. natural gas production is greater than that of the next ﬁve producers combined. In other words, although there is great concern that the United States is wholly dependent on foreign energy, it is actually one of the world’s largest energy producers. Given the vast size of the American economy, it is interesting to note that the United States is still underpopulated by global standards. Measured in inhabitants per square kilometer, the world’s average population density is 49. Japan’s is 338, Germany’s is 230, and America’s is only 31. If we exclude Alaska, which is largely uninhabitable, U.S. population density rises to 34. Compared to Japan or Germany, or the rest of Europe, the United States is hugely underpopulated. Even when we simply compare population in proportion to arable land—land that is suitable for agriculture—America has ﬁve times as much land per person as Asia, almost twice as much as Europe, and three times as much as the global average. An economy consists of land, labor, and capital. In the case of the United States, these numbers show that the nation can still grow—it has plenty of room to increase all three. There are many answers to the question of why the U.S. economy is so powerful, but the simplest answer is military power. The United States completely dominates a continent that is invulnerable to invasion and occupation and in which its military overwhelms those of its neighbors. Virtually every other industrial power in the world has experienced devastating warfare in the twentieth century. The United States waged war, but America itself never experienced it. Military power and geographical reality created an economic reality. Other countries have lost time recovering from wars. The United States has not. It has actually grown because of them. Consider this simple fact that I’ll be returning to many times. The United States Navy controls all of the oceans of the world. Whether it’s a junk in the South China Sea, a dhow off the African coast, a tanker in the Persian Gulf, or a cabin cruiser in the Caribbean, every ship in the world moves under the eyes of American satellites in space and its movement is guaranteed—or denied—at will by the U.S. Navy. The combined naval force of the rest of the world doesn’t come close to equaling that of the U.S. Navy. This has never happened before in human history, even with Britain. There have been regionally dominant navies, but never one that was globally and overwhelmingly dominant. This has meant that the United States could invade other countries—but never be invaded. It has meant that in the ﬁnal analysis the United States controls international trade. It has become the foundation of American security and American wealth. Control of the seas emerged after World War II, solidiﬁed during the ﬁnal phase of the European Age, and is now the ﬂip side of American economic power, the basis of its military power. Whatever passing problems exist for the United States, the most important factor in world affairs is the tremendous imbalance of economic, military, and political power. Any attempt to forecast the twenty- ﬁrst century that does not begin with the recognition of the extraordinary nature of American power is out of touch with reality. But I am making a broader, more unexpected claim, too: the United States is only at the beginning of its power. The twenty ﬁrst century will be the American century.

### 1NC Warming f/l

#### Can’t solve warming – The benefit would be negligible

Green 6 – [Jim, national nuclear campaigner with Friends of the Earth, has an honours degree in public health and a PhD in science and technology studies for his doctoral thesis on the Lucas Heights research reactor debates, energyscience.org.au, “Nuclear power and climate change,” November, <http://www.energyscience.org.au/FS03%20Nucl%20Power%20Clmt%20Chng.pdf>]

It is widely accepted that anthropogenic greenhouse gas emissions must be sharply reduced to avert climate change. However, nuclear power is at best a very partial, problematic and unnecessary response to climate change: • A doubling of nuclear power would reduce global greenhouse emissions by about 5%. A much larger nuclear expansion program would pose enormous proliferation and security risks, and it would run up against the problem of limited known conventional uranium reserves. • The serious hazards of civil nuclear programs - the repeatedly demonstrated contribution of civil nuclear programs to weapons proliferation, intractable waste management problems, and the risk of serious accidents. • The availability of a plethora of clean energy options - renewable energy sources plus energy efficiency - which, combined, can meet energy demand and sharply reduce greenhouse emissions. (See for example the reports produced by the Clean Energy Future Group).1 This information paper addresses the first of those arguments - the limitations of nuclear power as a climate change abatement strategy. A limited response Nuclear power is used almost exclusively for electricity generation. (A very small number of reactors are used for heat co-generation and desalination.) Electricity is responsible for less than one third of global greenhouse gas emissions. According to the Uranium Institute, the figure is “about 30%”.2 That fact alone puts pay to the simplistic view that nuclear power alone can ‘solve’ climate change. According to a senior energy analyst with the International Atomic Energy Agency, Alan McDonald: “Saying that nuclear power can solve global warming by itself is way over the top”.3 Ian Hore-Lacy from the Uranium Information Centre (UIC) claims that a doubling of nuclear power would reduce greenhouse emissions in the power sector by 25%.4 That figure is reduced to a 7.5% reduction if considering the impact on overall emissions rather than just the power sector. The figure needs to be further reduced because the UIC makes no allowance for the considerable time that would be required to double nuclear output. Electricity generation is projected to increase over the coming decades so the contribution of a fixed additional input of nuclear power has a relatively smaller impact. Overall, it is highly unlikely that a doubling of global nuclear power would reduce emissions by more than 5%.

#### Solving would obviously be unfeasible – no one would switch from coal

Squassoni 8 – [Sharon, Senior Associate, Nonproliferation Program -- Carnegie Endowment for International Peace, 3-12, “The Realities of Nuclear Expansion” Congressional Testimony: House Select Committee for Energy Independence and Global Warming, Washington, DC]

In 2004, Princeton scientists Stephen Pacala and Robert Socolow published a “wedge analysis” for stabilizing global climate change.3 Since fossil fuels currently emit seven billion tons of carbon/year and are projected to double that level through 2050 in the business-as-usual scenario, Pacala and Socolow considered what technologies and/or approaches might help stabilize those emissions at current levels (about 375 ppm). Seven wedges of reduced emissions (a cumulative effect of 25 billion tons through 2050, or one billion tons of carbon/year reduction at the end of that period) were postulated. One “wedge” would ultimately achieve a reduction of one billion tons per year (or 25 billion cumulative tons) by 2050. For nuclear energy to “solve” just one-seventh of the problem – lowering emissions by one billion tons per year – an additional 700 GWe of capacity would have to be built, assuming the reactors replaced 700 GWe of modern coal-electric plants.4 Because virtually all operating reactors will have to be retired in that time, this means building approximately 1070 reactors in 42 years, or about 25 reactors per year. Current global reactor capacity is 373 GWe or 439 reactors worldwide. In short, one “nuclear wedge” would require almost tripling current capacity. Mapping A “Realistic Growth” Scenario Nuclear Expansion5 The attached maps (see slide 1) depict estimates of reactor capacity growth for 2030 and 2050, according to three scenarios. The first is a “realistic growth” scenario, based on the U.S. Energy Information Administration figures for 2030.6 The second is what states have planned for 2030, or a “wildly optimistic” scenario. The third is roughly based on the high-end projections for 2050 done by MIT in their 2003 study entitled “The Future of Nuclear Power.” This 1500 GWe scenario lies between the Pacala-Socolow wedge and the Stern Review on the Economics of Climate Change estimates that nuclear energy could reduce carbon emissions between two billion and six billion tons/year (or 1800 GWe – 4500 GWe).7 A few caveats with respect to projecting nuclear energy expansion are necessary. Nuclear energy is undoubtedly safer and more efficient now than when it began fifty years ago, but it still faces four fundamental challenges: waste, cost, proliferation, and safety. It is an inherently risky business. Most industry executives will admit that it will only take one significant accident to plunge the “renaissance” back into the nuclear Dark Ages. Because of this, estimates are highly uncertain. For example, the U.S. Energy Information Administration does not use its computer model to estimate nuclear energy growth because, among other things, key variables such as public attitudes and government policy are difficult to quantify and project. That said, estimates tend to extrapolate electricity consumption and demand from gross domestic product (GDP) growth, make assumptions about nuclear energy’s share of electricity production, and then estimate nuclear reactor capacity. The United States, France, and Japan constitute more than half of total world nuclear reactor capacity (see slide 1). Yet half of the 34 reactors now under construction are in Asia.8 Under any scenario, nuclear power is expected to grow most in Asia, because of high Chinese and Indian growth and electricity demand. Under the realistic growth scenario, the U.S. Energy Information Administration estimates 2030 reactor capacity at 481 GWe. The International Energy Agency (IEA) envisions greater potential for expansion, projecting a range from 414 to 679 GWe in 2030, but the higher number would require significant policy support. With electricity consumption expected to double by 2030, nuclear energy will have a difficult time just keeping its market share – currently 16 percent of global production.9 According to the Intergovernmental Panel on Climate Change, with no change in energy policies, “the energy mix supplied to run the global economy in the 2025-2030 time-frame will essentially remain unchanged with about 80% of the energy supply based on fossil fuels.”10 Coal now provides 59% of electricity production, followed by hydroelectric power at 39% and oil and gas together provide 25%. Renewables are just 1-2% of total electricity production. Moreover, regions that have coal tend to use it, particularly for electricity generation, which increases greenhouse gas emissions. The IPCC has noted that “in recent years, intensified coal use has been observed for a variety of reasons in developing Asian countries, the USA and some European countries. In a number of countries, the changing relative prices of coal to natural gas have changed the dispatch order in power generation in favor of coal.” Many fear that states such as China and India – both of which are not subject to Kyoto Protocol targets because they are developing states – will meet their increased demand with cheap coal. Without further policy changes, according to the International Energy Agency, the share of nuclear energy could drop to 10% of global electricity production. “Wildly Optimistic” Growth Scenario Although some states, such as Germany and Sweden, plan to phase out nuclear power, the trend line is moving in the opposite direction. This growth scenario does not contain projections based on electricity demand, but instead takes at face value what states have projected for themselves. The result is a total of 700 GWe global capacity (see slide 2) – two-thirds of what one nuclear wedge to affect global climate change would require. The reason these estimates are wildly optimistic is that over 20 nations have announced intentions to install nuclear reactors. Several of these – Turkey, Egypt, and Philippines – had planned for nuclear power in the past, but abandoned such plans for various reasons. Some of these new nuclear plans are more credible than others and can be differentiated into those that have approved or funded construction, those that have clear proposals but without formal commitments, and those that are exploring nuclear energy (see slide 3). In the Middle East, these include Iran, Israel, Jordan and Yemen, with potential interest expressed by Syria, Kuwait, and the Gulf Cooperation Council states of Saudi Arabia, Oman, United Arab Emirates, Qatar, and Bahrain. In Europe, Belarus, Turkey and Azerbaijan have announced plans, as well as Kazakhstan. In Asia, Bangladesh, Thailand, Vietnam, Malaysia, and Indonesia have announced plans, and the Philippines has also expressed interest. Venezuela has also declared it will develop nuclear power. In Africa, Morocco, Tunisia, Libya, Egypt, and Nigeria have announced plans to develop nuclear power, and Algeria and Ghana have expressed interest.11 More than half of all those states are in the Middle East. Although this could result in reduced carbon emissions, because Middle Eastern states use more oil for electricity production (34%) than elsewhere, this is not where the real electricity demand is coming from. “Climate Change” Growth Scenario A rough approximation of where reactor capacity would expand in a climate change scenario is based on the high scenario of the 2003 MIT Study, “The Future of Nuclear Power.” For 1500 GW capacity, MIT estimated that 54 countries (an additional 23) would have commercial nuclear power programs. This essentially means a five-fold increase in the numbers of reactors worldwide and an annual build rate of 35 per year. In the event that smaller-sized reactors are deployed in developing countries – which makes eminent sense – the numbers could be much higher.12 If nuclear energy were assumed to be able to contribute a reduction of between two and six billion tons of carbon per year as outlined in the Stern Report, the resulting reactor capacity would range between 1800 GWe and 4500 GWe – increases ranging from six to ten times the current capacity.13 This would require building between 42 and 107 reactors per year through 2050. Impact on Uranium Enrichment Such increases in reactor capacity would certainly have repercussions for the front and back ends of the fuel cycle. Almost 90 percent of current operating reactors use lowenriched uranium (LEU). Presently, eleven countries have commercial uranium enrichment capacity and produce between 40 and 50 million SWU. A capacity of 1070 GWe – the one “wedge” scenario – could mean tripling enrichment capacity, requiring anywhere from 11 to 22 additional enrichment plants.14 A capacity of 1500 GWe would require quadrupling enrichment capacity (see slide 4).15 Further, if Stern Report nuclear expansion levels are achieved, enrichment capacity would have to increase ten-fold. In assessing where new uranium enrichment capacity might develop, the MIT study assumed that 18 states would have 10 GWe reactor capacity – the point at which domestic uranium enrichment becomes competitive with LEU sold on the international market – and thus might enrich uranium. (See slide 4 for a more modest approach, with nine additional countries enriching uranium).16 Impact on Spent Fuel Reprocessing A key question is whether an expansion of nuclear reactors would result in an expansion of spent fuel reprocessing. This is not necessarily the case, because decisions about whether to store fuel or reprocess it depend on several factors: existing storage capacities; fuel cycle approaches (once-through, one recycle, fast reactors) and new technologies; and cost. A shift to fast reactors that can burn or breed plutonium implies an increase in recycling, whether this is traditional reprocessing that separates out plutonium, or options under consideration now that would not separate out the plutonium. France and Japan now commercially reprocess their spent fuel and recycle the plutonium once in mixed oxide-fuelled reactors. Russia also reprocesses a small percentage of its spent fuel. A troubling development in the last two years from a nonproliferation perspective has been the U.S. embrace of recycling spent fuel under the Global Nuclear Energy Partnership, after a policy of 30 years of not encouraging the use of plutonium in the civil nuclear fuel cycle. Whether or not the United States ultimately reprocesses or recycles fuel, other states are now more likely to view reprocessing as necessary for an advanced fuel cycle. Constraints on Nuclear Expansion17 There are significant questions about whether nuclear expansion that could affect global climate change is even possible. In the United States, as the chief operating officer of Exelon recently told an industry conference, constraints include: the lack of any recent U.S. nuclear construction experience; the atrophy of U.S. nuclear manufacturing infrastructure; production bottlenecks created by an increase in worldwide demand; and an aging labor force.

#### Cant solve warming – Climate change turns their ability for effective nuclear reactors

Kopytko & Perkins, ’11 – [Natalie, PhD Researcher in the Environment Department, University of York, John, former chief economist at a major international consulting firm, advised the World Bank, United Nations, IMF, U.S. Treasury Department, Fortune 500 corporations, and countries in Africa, Asia, Latin America, and the Middle East, his books on economics and geo-politics have sold more than 1 million copies, spent many months on the New York Times and other bestseller lists, and are published in over 30 languages, “Climate Change, Nuclear Power, and the Adaptation-Mitigation Dilemma,” Energy Policy, [Volume 39, Issue 1](http://www.sciencedirect.com/science/journal/03014215/39/1), January 2011, Pages 318–333, Science Direct]

Numerous analysts from industry, commerce, government, academia, andnon-profits have promoted nuclear power as an appropriate mitigation for climate change. In essentially all cases the logic of the proposal is simple and appealing: • climate change results primarily from burning fossil fuels, which releases carbon dioxide to the atmosphere; • nuclear power yields no carbon emissions as electricity is generated; • therefore nuclear power is an appropriate, indeed perhaps ideal, mitigation for climate change. Appealing as this logic model appears, it unfortunately ignores a wide range of other issues, each of which impinges upon the quest for reduced carbon emissions. Thus it is too simplistic and seriously misleads. The argument leads to easy conclusions about the suitability of nuclear power to temper climate change when in fact a more robust analysis suggests the opposite conclusion. Perhaps the single most important factor undermining the simple logic model stems from the fact that nuclear reactors require enormous amounts of water to cool or condense the coolant which transfers heat from the core to the turbines and cools the reactor core. This is why nuclear power plants are located near substantial amounts of water: the ocean, large lakes, and big rivers. If climate change affects the temperature, quality, or quantity of water, then existing nuclear power plants may be adversely affected. This paper examines several ways in which climate change has already affected water in ways that create problems for existing nuclear power plants. Specifically it examines the effects of sea level rise on nine existing coastal sites in the USA and the consequences of changes in water for inland reactors in France. Geographic Information Systems (GIS) models of sea level rise and a review of existing reports and published literature suggest that numerous existing plants have been or may be adversely affected by climate change. We call the set of interactions among climate change, water, and nuclear power the “adaptation-mitigation dilemma.” This term signals that existing and projected climate change threatens the operations and safety of existing plants and poses other challenges to efforts to adapt to climate change. Thus existing nuclear power plants may not represent a good technology for mitigation of climate change. A separate question concerns the potential of new nuclear power plants to avoid the problems with water we identify in this paper. Maybe it’s possible to build new plants that don’t suffer the syndrome of problems in the adaptation-mitigation dilemma. For reasons explained in the conclusion of this paper, however, we believe that it may be quite difficult to fully avoid the dilemmas identified here. At the very least, avoiding these challenges will add costs and possibly increase the risks of nuclear power, both of which are already severe handicaps for this technology. This paper acknowledges that sharply differing opinions abound on what, if any, role is appropriate for nuclear power in the debates about climate change. It seeks, however, to shift the analysis and debates about nuclear power away from “Is it a good, safe, cost-effective way to reduce carbon emissions?” to “What can we learn about current nuclear power plants and how they have been or probably will be affected by the climate change that has already occurred?” With this shift comes the potential for analysis that is less fought with ideological baggage that hinders a clear understanding of nuclear power.

#### 20 years to solvency

**Diesendorf 10** [Mark, “Nuclear power: no solution to climate change”, Green Left, April 17, 2010]

The integral fast reactor [which promises to use existing stockpiles of nuclear waste to make carbon-free energy,] doesn't exist — it is the archetypal ink-moderated paper reactor. It's true that a tiny physical version of this concept, called Experimental Breeder Reactor-2, once operated in the US. But experimental energy technologies are just that — experiments, designed to test a concept.¶ They have to be redesigned before they can be scaled-up to a medium-sized demonstration stage. Then, provided several successful demonstrations can be achieved over a period of many years, they usually need further design modifications before they could possibly move to commercial scale with full mass-production.¶ Realistically, this whole process would take at least 20 years in the US — much longer in Australia if our government was so foolish as to become involved.

#### Don’t solve warming – can’t solve before the tipping point – but status quo efficiency can work

**Smith 11** [Gar, environmental journalist, He is the former editor of Earth Island Journal, and currently edits Earth Island Institute's weekly "eco-zine" The-Edge. NUCLEAR ROULETTE: THE CASE AGAINST A NUCLEAR RENAISSANCEhttp://ifg.org/pdf/Nuclear\_Roulette\_book.pdf]

More than 200 new reactors have been proposed around the world but not enough reactors can be built fast enough to replace the world’s vanishing fossil fuel resources.2 **Even if nuclear output** **could be tripled** by 2050 (which seems unlikely in light of the industry’s record to date), this would only lower greenhouse emissions by 25 to 40 billion annual tons—**12.5** to 20 percent **of the** **reductions needed to stabilize the climate**.3 The International Energy Agency estimates that renewables and efficiency measures could produce ten times these savings by 2050. The IEA estimates that cutting CO2 emissions in half by mid-century would require building 1,400 new 1,000-MW reactors—32 new reactors every year. But since it usually takes about 10 years from groundbreaking to atom-smashing, these reactors **could not be constructed fast enough to prevent an irreversible** “**tipping” of world climate**. This hardly seems feasible since the industry has only managed to bring 30 new reactors on-line over the past ten years. Of the 35 reactors the IEA listed as “under construction” in mid-2008, a third of these had been “under construction” for 20 years or longer. Some may never be completed. By contrast, a 1.5 MW wind turbine can be installed in a single day and can be operational 4 | The Watts Bar-1 reactor, 60 miles southwest of Knoxville, Tennesee, took 24 years to build. NUCLEAR REGULATORY COMMISSION in two weeks.4 Still, the pace of nuclear construction has picked up lately. In 2010, the number of reactor projects underway had ballooned to 66—with most located in China (27) and Russia (11). And it’s not just a matter of designing and building new reactors.The construction of 1,400 new nuclear reactors also would require building 15 new uranium enrichment plants, 50 new reprocessing plants and 14 new waste storage sites—a deal-breaker since the sole proposed U.S. storage site at Yucca Mountain is apparently dead .The cost of this additional nuclear infrastructure has been estimated at $3 trillion.5 Moreover, since the operating lifetime of these new reactors would still be a mere 40 years, even if new construction was practical, quick and affordable, it would only “solve” the global-warming problem for another 40 years, at which point the plants would need to be decommissioned.

#### Construction of new reactors causes warming – trades off with energy efficiency

**Roche\* 7 – \***Site editor, no direct author given, but N02 Nuclear Power.org is a site created and run by Pete Roche who is an energy consultant based in Edinburgh and policy adviser to the Scottish Nuclear Free Local Authorities, and the National Steering Committee of [UK NFLA](http://nfznsc.gn.apc.org/). Pete was co-founder of the Scottish Campaign to Resist the Atomic Menace (SCRAM), he has represented Greenpeace at international meetings and is active in several other areas relating to environmental protection and nuclear power [http://www.no2nuclearpower.org.uk/reports/Opportunity\_Costs\_Nuclear.pdf, January 2007 “Opportunity Costs of Nuclear Power]

Introduction The opportunity cost of any investment is the cost of forgoing the alternative outcomes that could have been purchased with the same money. So, of course all investments will forego other opportunities, but this briefing looks at those potential investments, which would be foregone, if we invest in nuclear power. Many advocates of new nuclear construction call for a “balanced energy policy” and promote the idea that ‘we need every energy technology’ in order to successfully tackle the climate change problem. This idea suggests that we have infinite amounts of money to spend on energy projects, which is obviously nonsense. Resources are scarce, so we need to make choices. Because climate change is a serious and urgent problem then we must spend our limited resources as effectively and quickly as possible - best buys first, not the more the merrier. For each dollar we spend we need to buy the maximum amount of “solution” possible. (The “least cost” solution) On both criteria, cost and speed, nuclear power is probably the least effective climate-stabilizing option on offer. As well as being more expensive, and taking longer to implement, the problem with spending on nuclear power is that it will detract from spending on other more effective options. Not only does nuclear power drain resources away from other options, but it also distracts attention from important decisions that have to be made to support those other options. And because there are so many problems associated with getting new reactor construction off the ground, it might not work. So in the worst case we might find that efforts to tackle climate change are seriously damaged by a decision to go ahead with reactor construction. Although the nuclear industry likes to give the impression that it can now finance new reactors without taxpayer subsidies, there are still large uncertainties about how the waste and decommissioning liabilities will be financed in many countries. Thus building new reactors could be potentially storing up future opportunity costs for taxpayers which they will have to accept whether they like it or not. Catastrophic opportunity cost Since we do not have unlimited resources, we have to choose how we spend. If we buy more of one thing, then it will be necessary for us to have less of another. Because of the seriousness of the climate change threat, it is essential that we spend our limited resources on the fastest and most effective climate solutions. Nuclear power is just the opposite. Investment in more expensive nuclear power will, in effect, worsen climate change because each dollar we spend is buying less solution than it would do if we were to spend it on energy efficiency. (1) Amory Lovins, of the respected Rocky Mountain Institute, says investing in nuclear power would be the worst thing we could do for climate change, because efforts to ‘revive’ this moribund technology will divert investment from cheaper market winners – cogeneration, renewables, and efficiency. Standard studies tend to compare the cost of new reactors with alternative centralised fossil-fuelled plants. They conclude that it might be possible to revive nuclear power if construction and operation is heavily subsidised or if carbon is heavily taxed. Lovins says these efforts would be futile, because large centralised power stations are not the real competition. Neither fossil-fuel or nuclear can compete with windpower, some other renewables, combined heat and power (CHP) and energy efficiency. We should not allow fears of a looming energy gap, or the urgency of tackling climate change to stampede us into making irrational decisions. Diversification has its merits, but the strategic value of a diversified portfolio would not be enough to justify buying every technology on offer at whatever cost. Lovins calculates that one US dollar buys roughly:- • 10kWh of new nuclear electricity (at its 2004 subsidised level) • 12-17kWh of wind powered electricity • 9-17kWh of gas-fired industrial cogeneration (adjusted for carbon emissions) • 20-65kWh of residential building cogeneration (again adjusted for carbon) • anything up to 100kWh of savings from energy efficiency A portfolio of least-cost investments in energy efficiency and decentralised generation will beat nuclear power by a large and rising margin.

#### Energy efficiency is key to stave off collapse of U.S. manufacturing

**Hutchinson and Matley 12** \*Ryan Matley brings nine years of experience consulting for and working in the mining, automotive, and electric utility industries to RMI. Previously, Ryan managed a portfolio of industrial emerging technology initiatives for the Pacific Gas & Electric Company’s DSM programs. Prior to that, he spent five years consulting on process performance and market forecasts for the power generation, automotive and mining industries, Robert Hutchinson is Program Director at Rocky Mountain Institute.  After several years in Alternative Energy R&D and a Stanford MBA, Hutch focused on international management consulting.  Many years alternating between the US and Latin America built deep expertise in heavy industry, telecoms, IT services, and energy as well as deep finance skills [http://www.scientificamerican.com/article.cfm?id=undertake-radical-efficiency-to-revive-us-industry&page=2, Can Radical Efficiency Revive U.S. Manufacturing?, March 16th 2012]

Industry has long formed the foundation of America's economy, from before the first Ford Model T factory to the military-industrial complex that grew out of two world wars to the robust economic growth and high-tech innovation that followed. And whereas U.S. manufacturing is experiencing a resurgence, its old foundation—built on cheap [fossil fuels](http://www.scientificamerican.com/topic.cfm?id=fossil-fuels) and plentiful electricity—is showing cracks. Rising and volatile fuel prices, supply-[security](http://www.scientificamerican.com/topic.cfm?id=security) concerns and pressures on the environment are wrecking balls thumping away at many of the underpinnings of our country's key industries—and thus our prosperity. Fortunately, we can render these wrecking balls harmless through a systematic drive to upgrade industrial energy efficiency. Even with no technology breakthroughs such an effort can, in just over a generation, transform U.S. industry and provide 84 percent more output in 2050 consuming 9 to 13 percent less energy and 41 percent less fossil fuel than it uses today. This scenario, outlined in [Reinventing Fire](http://www.reinventingfire.com), a book and strategic initiative by Rocky Mountain Institute (RMI), can help U.S. industry build durable competitive advantage and keep jobs from going overseas. These seem like incredible numbers: Twice today's efficiency? Output nearly doubled with reduced energy use? The opportunity is so significant because, in spite of efficiency gains over the past decade, plentiful opportunities for energy efficiency remain for industry. The U.S. Department of Energy's 24 industrial assessment centers, which have offered energy audits for more than 30 years, report that energy savings per recommendation increased by 9 percent between 1985 and 2005. Turning our wastefulness into profit is our biggest opportunity to reinvent fire. Dramatic efficiency gains in industry can be enabled by transformations occurring in tandem in other key sectors of our economy. For example, the hugely energy-intensive petroleum refining industry will shrink or eventually disappear as vehicles electrify. But efficiency can be doubled in two main ways: applying new technologies to old sectors, and applying old technologies to new sectors. Adding new technologies to old sectors A well-known success story is the steel industry. Since it recovered from the capacity overhang and devastating mill closures of the 1970s, it has quietly expanded with state-of-the-art facilities. The energy intensity to produce a ton of steel fell 40 percent from 1978 to 2008. This was driven by a new technology well suited to our scrap-rich economy: the share of steel production from electric arc furnaces (EAFs) grew from 25 percent to nearly 60 percent. EAFs recycle steel scrap in an electric furnace to produce new steel, bypassing the energy-intensive, coking coal–powered step of converting iron ore to metallic iron, and then to steel in a conventional blast furnace. Adding EAFs close to scrap sources has also pulled steel recycling rates up to the mid-80 percent range in recent years. Even the conventional route has a more efficient alternative that is starting to make inroads. Steel industry bellwether Nucor recently broke ground on a new direct reduced iron plant in Louisiana. This innovation replaces coal with natural gas in the iron ore conversion step. If the steel industry continues to adopt new technology, it can help lead the transition outlined in Reinventing Fire. Some old industries have less positive stories. Pulp and paper is still struggling with declining demand for its core product, a dynamic that stymies investment in new and existing facilities. Paper mills are often net-zero or even net energy producers, so many would ask: Why bother? But pulping typically produces a potentially valuable by-product—black liquor. Gasifying it has the potential to transform the industry, unlocking the opportunity for the pulp and paper producer of the past to become the biorefinery of the future—producing a portfolio of products alongside paper, from renewable electricity to boutique chemicals and bulk biofuels. A new industrial system could leverage what once was considered waste. In Kalundborg, Denmark, for example, materials and energy flow in a symbiotic dance among a refinery, power plant, pharmaceutical factory, drywall plant and fish farm—transforming waste from one operation into valuable fodder for another, and even supplying heat to the city of Kalundborg and fertilizer to surrounding farms. The flagging paper sector could similarly help lead in reinventing fire, instead of fleeing to countries that grow trees faster than we do. Applying old technologies to new sectors New and growing sectors like the semiconductor industry have a high energy-saving potential despite their modernity. These industries have high investment rates and rebuild their factories often. Therefore, paying attention to energy, reducing waste and improving process designs can pay back many times over as [plants](http://www.scientificamerican.com/topic.cfm?id=plants) are cloned in commonly used "copy exactly" programs. Aggressive, radical efficiency is key. Traditional industry logic is to focus on productivity and yield, not energy. This can create home runs—increased throughput at the same cost—instead of base hits—the same throughput for less capital cost. But with radical efficiency, as yields rise, an efficiency-based approach becomes more powerful and lasting. Even in such yield-centric businesses as chip fabs, the power of the energy lens has now been proved. Texas Instruments (TI) used whole-system, energy-focused design to build a million-square-foot [semiconductor fabrication plant](http://www.youtube.com/watch?v=90gDc7EFMdo&feature=player_embedded#%21) in Richardson, Texas. This facility, which opened in 2009, was the first LEED Gold–rated semiconductor facility. Its innovative design saved $4 million in annual energy operating cost and 35 percent of its [water](http://www.scientificamerican.com/topic.cfm?id=water) use compared with TI's previous chip fab built just four miles away. Thanks to collaboration with RMI's designers, this plant cost $230 million less than the traditional design, and got the same yields; that's why it was built in Texas, not Asia. Data centers are another classic energy-centric, growing industry that lately began to peer through the energy lens, with great benefit. In 2003 RMI released a seminal report on how to slash energy use and capital cost in large data centers. As the industry boomed, a 2007 report to Congress estimated that data centers accounted for 1.5 percent of U.S. electricity use, and that use could double in five years. Now, four years later, data centers account for 2 percent of U.S. electricity use. While demand for computing power continues to grow, industry leaders have increasingly embraced efficiency. They invested in energy-saving server virtualization as well as air-side or water-side economizers to limit chiller operation, and they paid careful attention to layout and hot and cold airflows. These traditional thermal techniques, well known in the buildings sector, formed the basis of a revolution. The biggest and best in the scale data center world measured energy use and competed for the title of "most efficient." Much like the one RMI helped design with EDS (Electronic Data Systems, now part of HP), currently running in Wynyard, England, these data centers use only 5 to 10 percent of their total energy to cool the equipment and power the auxiliary systems. The remaining 90 to 95 percent of the energy powers the IT equipment performing work within the data center. (Therein lies the next big opportunity—a return to the high-tech side of the opportunity.) Unfortunately, those large data centers make up only a small fraction of total data center electricity use. But there's lots of opportunity left to capture: EDS estimated that had the client adopted all of RMI's recommendations, the facility could have saved up to 95 percent of its energy use and about half its capital cost. That's the next frontier for smart designers.

#### And, manufacturing capabilities key to technology necessary for U.S. deterrence

**O’Hanlon et al 12** (Mackenzie Eaglen, American Enterprise Institute Rebecca Grant, IRIS Research Robert P. Haffa, Haffa Defense Consulting Michael O'Hanlon, The Brookings Institution Peter W. Singer, The Brookings Institution Martin Sullivan, Commonwealth Consulting Barry Watts, Center for Strategic and Budgetary Assessments “The Arsenal of Democracy and How to Preserve It: Key Issues in Defense Industrial Policy January 2012,” pg online @ <http://www.brookings.edu/~/media/research/files/papers/2012/1/26%20defense%20industrial%20base/0126_defense_industrial_base_ohanlon> //um-ef)

The current wave of defense cuts is also different than past defense budget reductions in their likely industrial impact, as **the U.S. defense industrial base is in a much different place than it was in the past**. Defense industrial issues are too often viewed through the lens of jobs and pet projects to protect in congressional districts. **But the overall health of the firms that supply the technologies our armed forces utilize does have national security resonance**. Qualitative superiority in weaponry and other key military technology has become an essential element of American military power in the modern era—**not only for winning wars but for deterring them**. **That requires world-class** scientific and **manufacturing capabilities—**which in turn can also generate civilian and military export opportunities for the United States in a globalized marketplace.

#### Deterrence solves nuclear war

**Robinson 1** \*C. Paul Robinson is president and director of the Department of Energy Sandia National Laboratories [“A White Paper: Pursuing a New Nuclear Weapons Policy for the 21st Century,” 3/22/2001, http://www.nukewatch.org/importantdocs/resources/pursuing\_a\_new\_nuclear\_weapons\_p.html]

I served as an arms negotiator on the last two agreements before the dissolution of the Soviet Union and have spent most of my career enmeshed in the complexity of nuclear weapons issues on the government side of the table. It is abundantly clear (to me) that formulating a new nuclear weapons policy for the start of the 21st Century will be a most difficult undertaking. While the often over-simplified picture of deterrence during the Cold War—two behemoths armed to the teeth, staring each other down—has thankfully retreated into history, there are nevertheless huge arsenals of nuclear weapons and delivery systems, all in quite usable states, that could be brought back quickly to their Cold War postures. Additionally, throughout the Cold War and ever since, there has been a steady proliferation of nuclear weapons and other weapons of mass destruction by other nations around the globe. The vast majority of these newly armed states are not U.S. allies, and some already are exhibiting hostile behaviors, while others have the potential to become aggressors toward the U.S., our allies, and our international interests. Russia has already begun to emphasize the importance of its arsenal of nuclear weapons to compensate for its limited conventional capabilities to deal with hostilities that appear to be increasing along its borders. It seems inescapable that the U.S. must carefully think through how we should be preparing to deal with new threats from other corners of the world, including the role that nuclear weapons might serve in deterring these threats from ever reaching actual aggressions. I personally see the abolition of nuclear weapons as an impractical dream in any foreseeable future. I came to this view from several directions. The first is the impossibility of ever “uninventing” or erasing from the human mind the knowledge of how to build such weapons. While the sudden appearance of a few tens of nuclear weapons causes only a small stir in a world where several thousands of such weapons already exist, their appearance in a world without nuclear weapons would produce huge effects. (The impact of the first two weapons in ending World War II should be a sufficient example.) I believe that the words of Winston Churchill, as quoted by Margaret Thatcher to a special joint session of the U.S. Congress on February 20, 1985, remain convincing on this point: “Be careful above all things not to let go of the atomic weapon until you are sure, and more sure than sure, that other means of preserving the peace are in your hands.” Similarly, it is my sincere view that the majority of the nations who have now acquired arsenals of nuclear weapons believe them to be such potent tools for deterring conflicts that they would **never surrender them**. Against this backdrop, I recently began to worry that because there were few public statements by U.S. officials in reaffirming the unique role which nuclear weapons play in ensuring U.S. and world security, far too many people (including many in our own armed forces) were beginning to believe that perhaps nuclear weapons no longer had value. It seemed to me that it was time for someone to step forward and articulate the other side of these issues for the public: first, that nuclear weapons remain of vital importance to the security of the U.S. and to our allies and friends (today and for the near future); and second, that nuclear weapons will likely have an enduring role in preserving the peace and preventing **world wars** for the foreseeable future. These are my purposes in writing this paper. For the past eight years, I have served several Commanders-in-Chief of the U.S. Strategic Command by chairing the Policy Subcommittee of the Strategic Advisory Group (SAG). This group was asked to help develop a new terms of reference for nuclear strategy in the post-Cold War world. This paper draws on many of the discussions with my SAG colleagues (although one must not assume their endorsement of all of the ideas presented here). We addressed how nuclear deterrence might be extended—not just to deter Russia—but how it might serve a continuing role in deterring wider acts of aggression from any corner of the world, including deterring the use of nuclear, chemical or biological weapons. [Taken together, these are normally referred to as Weapons of Mass Destruction (WMD).] My approach here will be to: (1) examine what might be the appropriate roles for nuclear weapons for the future, (2) propose some new approaches to developing nuclear strategies and policies that are more appropriate for the post-Cold War world, and (3) consider the kinds of military systems and nuclear weapons that would be needed to match those policies. The Role(s) of Nuclear Weapons The Commander-in-Chief of the Strategic Command, Admiral Rich Mies, succinctly reflected the current U.S. deterrent policy last year in testimony to the U.S. Senate: “Deterrence of aggression is a cornerstone of our national security strategy, and strategic nuclear forces serve as the most visible and most important element of our commitment Š (further) deterrence of major military attack on the United States and its allies, particularly attacks involving **weapons of mass destruction**, remains our highest defense priority.” While the application of this policy seemed clear, perhaps we could have said even “straightforward,” during the Cold War; application of that policy becomes even more complicated if we consider applying it to any nation other than Russia. Let me first stress that nuclear arms must never be thought of as a single “cure-all” for security concerns. For the past 20 years, only 10 percent of the U.S. defense budget has been spent on nuclear forces. The other 90 percent is for “war fighting” capabilities. Indeed, conflicts have continued to break out every few years in various regions of the globe, and these nonnuclear capabilities have been regularly employed. By contrast, we have not used nuclear weapons in conflict since World War II. This is an important distinction for us to emphasize as an element of U.S. defense policy, and one not well understood by the public at large. Nuclear weapons must never be considered as war fighting tools. Rather we should rely on the catastrophic nature of nuclear weapons to achieve war prevention, to prevent a conflict from **escalating** (e.g., **to the use of weapons of mass destruction**), or to help achieve war termination when it cannot be achieved by other means, e.g., if the enemy has already escalated the conflict through the use of weapons of mass destruction. Conventional armaments and forces will remain the backbone of U.S. defense forces, but **the inherent threat to escalate to nuclear use can help to prevent conflicts from ever starting, can prevent their escalation, as well as bring these conflicts to a swift and certain end**. In contrast to the situation facing Russia, I believe we cannot place an over-reliance on nuclear weapons, but that we must maintain adequate conventional capabilities to manage regional conflicts in any part of the world. Noting that the U.S. has always considered nuclear weapons as “weapons of last resort,” we need to give constant attention to improving conventional munitions in order to raise the threshold for which we would ever consider nuclear use. It is just as important for our policy makers to understand these interfaces as it is for our commanders. Defenses Although it is beyond the scope of this paper to strictly consider “defensive” tactics and armaments, I believe it is important for the United States to consider a continuum of defensive capabilities, from boost phase intercept to terminal defenses. Defenses have always been an important element of war fighting, and are likely to be so when defending against missiles. Defenses will also provide value in deterring conflicts or limiting escalations. Moreover, the existence of a credible defense to blunt attacks by armaments emanating from a rogue state could well eliminate that rogue nation’s ability to dissuade the U.S. from taking military actions. If any attack against the U.S., its allies, or its forces should be undertaken with nuclear weapons or other weapons of mass destruction, there should be no doubt in the attacker’s mind that the United States might retaliate for such an attack with nuclear weapons; but the choice would be in our hands.

#### No Resource Wars – Three Reasons

* Trade
* Low Benefit
* Decline in nonrenewable costs

Deudney 99 – (Dan, Associate Professor of Political Science, Johns Hopkins, Contested Grounds: Security and Conflict in the New Environmental Politics, Eds. Deudney & Matthews p 205-6)

The hypothesis that states will begin fighting each other as natural resources are depleted and degraded seems intuitively accurate. The popular metaphor of a lifeboat adrift at sea with declining supplies of clean water and rations suggests there will be fewer opportunities for positive-sum gains between actors as resource scarcity grows. Many fears of resource war are derived from the cataclysmic world wars of the first half of the twentieth century Influenced by geopolitical theories that emphasized the importance of land and resources for great power status, Adolf Hitler fashioned Nazi German war aims to achieve resource autonomy. The aggression of Japan was directly related to resource goals: lacking indigenous fuel and minerals, and faced with a slowly tightening embargo by the Western colonial pow ers in Asia, the Japanese invaded Southeast Asia for oil, tin, and rub ber. Although the United States had a richer resource endowment than the Axis powers, fears of shortages and industrial strangulation played a central role in the strategic thinking of American elites about world strategy. During the Cold War, the presence of natural resources in the Third World helped turn this vast area into an arena for East-West conflict. Given this record, the scenario of conflicts over resources playing a powerful role in shaping international order should be taken seriously. However, there are three strong reasons for concluding that the familiar scenarios of resource war are of diminishing plausibility for the foreseeable future. First, the robust character of the world trade system means that states no longer experience resource dependency as a major threat to their military security and political autonomy. During the 1930s, the collapse of the world trading system drove states to pursue economic autarky, but the resource needs of contemporary states are routinely met without territorial control of the resource source. As Ronnie Lipschutz has argued, this means that re source constraints are much less likely to generate interstate violence than in the past. Second, the prospects for resource wars are diminished by the growing difficulty that states face in obtaining resources through territorial conquest. Although the invention of nuclear explosives has made it easy and cheap to annihilate humans and infrastructure in extensive areas, the spread of conventional weaponry and national consciousness has made it very costly for an invader, even one equipped with advanced technology, to subdue a resisting population, as France discovered in Indochina and Algeria, the United States in Vietnam, and the Soviet Union in Afghanistan. At the lower levels of violence capability that matter most for conquering and subduing territory; the great powers have lost effective military superiority and are unlikely soon to regain it. Third, nonrenewable resources are, contrary to intuitive logic, becoming less economically scarce. There is strong evidence that the world is entering what H. E. Goeller and Alvin M. Weinberg have labeled the “age of substitutability,” in which industrial technology is increasingly capable of fashioning ubiquitous and plentiful earth materials such as iron, aluminum, silicon, and hydrocarbons into virtually everything needed by modem societies. The most striking manifestation of this trend is that prices for virtually every raw material have been stagnant or falling for the last two decades despite the continued growth in world economic output. In contrast to the expectations widely held during the 1970s that resource scarcity would drive up commodity prices to the benefit of Third World raw material suppliers, prices have fallen.

#### Empirical Evidence

Salehyan 7 – Professor of Political Science at the University of North Texas. (Idean, 6-14 “The New Myth About Climate Change Corrupt, tyrannical governments—not changes in the Earth’s climate—will be to blame for the coming resource wars.” <http://www.foreignpolicy.com/articles/2007/08/13/the_new_myth_about_climate_change>)

First, aside from a few anecdotes, there is little systematic empirical evidence that resource scarcity and changing environmental conditions lead to conflict. In fact, several studies have shown that an abundance of natural resources is more likely to contribute to conflict. Moreover, even as the planet has warmed, the number of civil wars and insurgencies has decreased dramatically. Data collected by researchers at Uppsala University and the International Peace Research Institute, Oslo shows a steep decline in the number of armed conflicts around the world. Between 1989 and 2002, some 100 armed conflicts came to an end, including the wars in Mozambique, Nicaragua, and Cambodia. If global warming causes conflict, we should not be witnessing this downward trend. Furthermore, if famine and drought led to the crisis in Darfur, why have scores of environmental catastrophes failed to set off armed conflict elsewhere? For instance, the U.N. World Food Programme warns that 5 million people in Malawi have been experiencing chronic food shortages for several years. But famine-wracked Malawi has yet to experience a major civil war. Similarly, the Asian tsunami in 2004 killed hundreds of thousands of people, generated millions of environmental refugees, and led to severe shortages of shelter, food, clean water, and electricity. Yet the tsunami, one of the most extreme catastrophes in recent history, did not lead to an outbreak of resource wars. Clearly then, there is much more to armed conflict than resource scarcity and natural disasters