## 1AC

### Plan

#### The United States federal government should increase loan guarantees for nuclear power in the United States.

### Gas Advantage

#### Natural gas is gaining market dominance – expansion of nuclear power avoids a bridge to nowhere

Jesse Jenkins, director of energy and climate policy at the Breakthrough Institute, previously worked as a Policy and Research Associate at the Renewable Northwest Project, 1-20-2012, “Avoiding a Natural Gas Bridge to Nowhere,” The Energy Collective, http://theenergycollective.com/breakthroughinstitut/74658/avoiding-natural-gas-bridge-nowhere

Just as the history of unconventional natural gas production in America was fundamentally shaped by government support for new technology development, so too will the future of natural gas depend on America's willingness to make long-term public investments in advanced energy technologies. A convenient narrative has taken hold concerning the development of unconventional gas extraction from shale formations. It goes like this: Once a marginal and shrinking contributor to domestic primary energy, hydraulic fracturing, or "fracking" has unlocked vast reserves of shale gas and ignited a revolution in North American natural gas production, leading to sharp increases in proven reserves and decreases in gas prices. Technical improvements in fracking technology and the diligence of private sector gas companies led by independent wildcatter George Mitchell brought about this renaissance, guaranteeing a future of lower energy prices, cleaner-burning fuel, and a more energy-secure economy. It's a convenient narrative of independent American ingenuity. But like so many similar stories, this popular tale belies the critical partnership of the federal government in the development of the key technologies that enabled today's shale gas boom. As an independent investigation by the Breakthrough Institute revealed, the federal government performed the requisite R&D and demonstration that led to massive hydraulic fracturing, directional drilling, and microseismic imaging -- the key component technologies that made the shale revolution possible. The gas industry was languishing in the 1970s, suffering from falling annual production and increased energy prices. Gas companies reached out to the federal government for assistance in mapping unconventional gas resources and developing the technologies needed to extract them. This partnership was sustained through the 1990s, when Texas-based Mitchell Energy experimented with hydraulic fracturing technologies pioneered with federal government assistance and partnered with the Department of Energy to complete its first horizontal drilling installation. By the late 1990s, Mitchell had perfected a cost-effective fracking technique and the shale boom had begun. It is no small exaggeration to say that government investment in unconventional gas extraction and mapping technologies fundamentally changed the history - and future - of American natural gas markets. Domestic gas prices have plummeted and production has steadily increased, reversing decades of decline. America now possesses a seemingly abundant and relatively clean substitute for polluting, carbon-intensive coal-fired power plants, potentially accelerating a transition to a healthier, lower-carbon electricity system. With increasing pollution controls on coal-fired power plants and lower relative prices for natural gas, all signs point to natural gas eclipsing coal in the electric power sector in the next couple decades. With natural gas prices achieving an unprecedented divergence from global oil prices, the United States may even enhance domestic energy security and reduce exposure to oil markets by substituting gas for oil in certain transportation segments (e.g. heavy duty trucking or fleet vehicles). Cheap gas simultaneously puts pressure on higher-cost nuclear, wind, and solar energy, however. If cheap gas leads to complacency in the development of sustainable, low-carbon electricity sources, today's gas boon may become tomorrow's curse, as natural gas eclipses not only coal, but also cleaner, carbon-free energy sources. An increasingly dominant role for natural gas in America's energy mix also exposes the United States to the inherent volatility of natural gas markets. As a gas, methane flows much faster from wells than crude oil. Natural gas wells thus produce and deplete quite rapidly, with roughly 50 percent of a typical well's lifetime production expended in the first three or four years. This basic dynamic of rapid production and depletion often leads to a boom-bust cycle in markets, as anyone observing North American natural gas markets over the past half century can attest. If North America begins to export large quantities of natural gas, this inherent volatility will only be exacerbated. The future of natural gas is unlikely to part with this history of boom and bust - unless the United States once again commits to long-term investment in the development of affordable, clean, domestic energy technologies. Without significant and strategic investments in next-generation solar, wind, nuclear, and electric vehicles, there's every reason to believe the natural gas revolution will continue and gas will ultimately become an increasingly dominant share of the U.S. energy supply. The result will likely be near-term declines in CO2 and pollutants along with growing reliance on another volatile and increasingly costly fossil energy source. The shale gas "bridge fuel" may well become a bridge to nowhere. If instead the United States makes smart, sustained investments in clean energy R&D, demonstration, manufacturing, and infrastructure, there's no reason to believe America can't continue to unlock even greater supplies of cleaner, cheaper, domestic energy technologies, from next-generation solar to advanced nuclear reactors. In short, America's energy future, just like its past, depends on our willingness to invest in innovation.

#### Long term lock in is coming – building up alternatives is key

Christopher Jones, Ciriacy-Wantrup Fellow, University of California-Berkeley, 8-29-2012, “Natural Gas: Bridge or Dead End?” Huffington Post, http://www.huffingtonpost.com/christopher-f-jones/bridge-or-dead-end\_b\_1837015.html

Natural gas is often touted as a bridge fuel: an interim step between the heavily polluting fossil fuels we depend on today and the clean renewable energy systems we hope for tomorrow. But the infrastructure we deploy to increase natural gas may actually inhibit the transition to solar and wind power. Rather than a bridge, natural gas may be a dead end. The idea of natural gas as a bridge draws on three main points. First, natural gas produces significantly less carbon dioxide than coal or oil. Second, it releases fewer impurities like sulfur and mercury compared with other fossil fuels. Third, many experts anticipate that obtaining even 20 percent of our energy from renewables in the next couple decades will be difficult. Natural gas, advocates argue, offers a more realistic large-scale carbon reduction strategy in the short-term because we have already addressed many of the technical challenges of producing, transporting, and consuming it. These considerations merit attention from the pragmatic environmentalist. Greatly reducing carbon emissions without lowering overall energy consumption is a laudable goal if it can be done in an environmentally responsible manner. Yet in addition to thinking about how we build a natural gas bridge, it is imperative that we devote equal attention to how we get off. A good bridge requires off-ramps. If we consider the role of infrastructure in energy transitions, this might be harder than we think. Critics of natural gas have typically focused on issues of pollution rather than infrastructure. First, there has been widespread opposition to 'fracking' shale gas reserves, a process that may contaminate drinking water, trigger minor earthquakes, and produce many other environmental consequences. Second, there are debates over whether natural gas really has a beneficial impact on climate. It may produce less greenhouse gas, but leaks of methane might more than offset these gains. These are important issues, but it is also worth examining the impact that expanding natural gas infrastructure will have on renewable energy systems. Building a natural gas bridge will require a significant expansion of infrastructure: drilling wells for production, pipelines for distribution, and a range of devices for consumption including power plants, home furnaces, and industrial ovens. Investing in these systems will increase the supply of natural gas and lower its costs through economies of scale. As a result, consumers will find it cheaper and easier to use natural gas. This is a straightforward account of what infrastructure does -- it facilitates certain types of behaviors. What is less appreciated is the fact that infrastructure cuts two ways. These systems will not simply provide an advantage for natural gas; they will make it progressively harder and more expensive to transition to renewables. We can examine this point by thinking about relative prices and sunk costs. Relative prices often matter more than absolute prices for energy transitions. For consumers, it is not simply the price of an energy source that matters; it is how much more or less that energy source costs than other options. Right now, natural gas is already cheaper than solar and wind for electricity production in most analyses. With significant investments in natural gas infrastructure, this price gap is only likely to grow. Therefore, even though the absolute price of renewable energy will not change, wind and solar will become less attractive to consumers because they will cost relatively more. What's more, these inequalities are likely to become more extreme over time due to sunk costs. Most of the systems designed to burn natural gas, like furnaces and electrical generating equipment, are expensive and designed to last for decades. Once large sums have been paid to purchase such systems, short-term price changes matter far less to consumers. Even if natural gas triples in price, prior investments in these systems will still act as a disincentive for switching to renewables. The sunk costs in infrastructure, therefore, further suggest that once we get on the bridge, it will be hard to get off. We need not be resigned to this fate. The key is to think not simply about building a bridge, but also about building off-ramps.

#### Natural gas as a bridge ensures a methane apocalypse – expansion of nuclear reduces the short run magnitude of emissions preventing the climate from crossing short run tipping points.

Bill Chameides, Dean, Duke University's Nicholas School of the Environment, 7-20-2012, “Natural Gas: A Bridge to a Low-Carbon Future or Not?” Huffington Post, http://www.huffingtonpost.com/bill-chameides/-natural-gas-a-bridge-to\_b\_1690857.html

Not really, scientists like Bob Howarth of Cornell University, protested. Why? Before answering that, you need to know a couple of background facts. First, methane, the major component of natural gas, is itself a very potent greenhouse gas -- some 21 times more effective a warmer than CO2 on a 100-year basis. And second, when we use natural gas, there are inevitably fugitive emissions, leaks during mining, transport, and consumption that allow methane to escape into the atmosphere where it can do its global warming thing. What Howarth argued in a much-debated paper published last year is that the leakage rates are so high that, contrary to conventional wisdom, transitioning from coal to natural gas would actually lead to more global warming than just sticking with coal, even though coal is the most carbon-intensive of the fossil fuels.¶ Since the paper's publication, other investigators and studies have weighed in on the matter, including RealClimate's Gavin Smith; the Council on Foreign Relations' Michael Levi; Ramón Alvarez of Environmental Defense Fund and co-authors; and another Cornell scientist, Lawrence Cathles. But a definitive conclusion has been elusive because the actual magnitude of these fugitive emissions remains very poorly defined.¶ Chapter 3. Methane Leakage Exonerated?¶ The upshot of the debate about the importance of fugitive emissions has led to a general consensus that we need a very thorough investigation into the leakage issue. In short we need to first pin down the magnitude of fugitive emissions and then cut them down by locking the methane up. (See here and here.)¶ But now Cornell's Cathles argues in a new paper published last week in the journal Geochemistry Geophysics Geosystems that fugitive emissions may not be that sinister after all. Or at least not if natural gas is indeed used as a bridge fuel that is first phased in as coal and some oil are phased out and then eventually is itself phased out in favor of carbon-free energy sources.¶ Assuming periods of 50, 100, and 200 years to make the transition from coal to natural gas to renewables, Cathles's model calculations indicate that the long-term (i.e., multiple decades to century timescales) climate impacts of the fugitive methane emissions are relatively small. The reason is that methane has a relatively short lifetime in the atmosphere -- about 12 years. And so once natural gas is no longer used as a fuel, the methane in the atmosphere from fugitive emissions will be removed from the atmosphere and so the warming from those emissions will be essentially gone. CO2 on the other hand is long-lived and so, Cathles argues, over the long term using natural gas instead of coal or oil is preferable because less CO2 will have been emitted in that scenario. Well, it's preferable provided we use natural gas as a transition fuel that eventually gives way to even cleaner renewables and/or nuclear. And then there's the issue of the short-term climate effects from fugitive emissions.¶ Chapter 4. The Question of the Short Term¶ Cathles's point about the transient effects of methane fugitive emissions is well taken. But there is a potential catch and it relates to short-term climate effects. During the transition period, when fugitive methane from using natural gas would build up in the atmosphere, there is a possibility, depending upon the magnitude of the methane emissions, that we would experience more short-term warming than if we were to have stuck with coal and oil. We might think of this as the transient version of the Howarth argument.¶ Now, as long as the fugitive emissions are small or the Earth system is "reversible," the transient Howarth scenario does not seem all that worrisome. But what if the emissions are large? And what if the disturbances from global warming are not reversible? Then we would have a problem. The transition to natural gas would lead to more warming for a period of time until natural gas is phased out and the excess methane is removed from the atmosphere. With the exit of the excess methane, the extra warming would also go away. Cathles seems to argue that all would be well:¶ "Even when methane leakage is so large (L = 10% of consumption) that substituting gas for coal and oil increases global warming in the short term, the benefit of gas substitution returns in the long term."¶ But it is not all that obvious that the impacts from global warming are reversible. If fragile ecosystems like coral reefs are decimated by a decade or two of extra methane-induced warming, can we be sure that they will recover once the methane is flushed from the atmosphere? Probably not.

#### Controlling methane emissions is more important than CO2 – methane hits us while we are vulnerable.

Joe Romm, Fellow at American Progress and is the editor of Climate Progress, acting assistant secretary of energy for energy efficiency and renewable energy in 1997, PHD in physics from MIT, 4-9-2012, “Natural Gas Is A Bridge To Nowhere Absent A Carbon Price AND Strong Standards To Reduce Methane Leakage”, http://thinkprogress.org/climate/2012/04/09/460384/natural-gas-is-a-bridge-to-nowhere-absent-a-carbon-price-and-strong-standards-to-reduce-methane-leakage/

A new journal article finds that methane leakage greatly undercuts or eliminates entirely the climate benefit of a switch to natural gas. The authors of “Greater Focus Needed on Methane Leakage from Natural Gas Infrastructure“ conclude that “it appears that current leakage rates are higher than previously thought” and “Reductions in CH4 Leakage Are Needed to Maximize the Climate Benefits of Natural Gas.” Natural gas is mostly methane – a very potent greenhouse gas, though with a much shorter lifetime in the atmosphere than CO2, which is emitted by burning fossil fuels like natural gas. Recent studies suggest a very high global warming potential (GWP) for CH4 vs CO2, particularly over a 20-year time frame. The new Proceedings of the National Academy of Sciences study introduces the idea of “technology warming potentials” (TWPs) to reveal “reveal time-dependent tradeoffs inherent in a choice between alternative technologies.” In this new approach the potent warming effect of methane emissions undercuts the value of fuel switching in the next few decades, exactly the timeframe we need to reverse the warming trend if we are to have any chance at triggering amplifying feedbacks and preventing multiple catastrophes. For instance, the new study finds that a big switch from coal to gas would only reduce TWP by about 25% over the first three decades — far different than the typical statement that you get a 50% drop in CO2 emissions from the switch. Note that the conclusion above is based on “EPA’s latest estimate of the amount of CH4 released because of leaks and venting in the natural gas network between production wells and the local distribution network” of 2.4%. Many experts believe the leakage rate is higher than 2.4%, particularly for the fastest growing new source of gas — hydraulic fracturing. Also, recent air sampling by NOAA over Colorado found 4% methane leakage, more than double industry claims. The study notes: We emphasize that our calculations assume an average leakage rate for the entire U.S. natural gas supply (as well for coal mining). Much work needs to be done to determine actual emis- sions with certainty and to accurately characterize the site-to-site variability in emissions. However, given limited current evidence, it is likely that leakage at individual natural gas well sites is high enough, when combined with leakage from downstream operations, to make the total leakage exceed the 3.2% threshold beyond which gas becomes worse for the climate than coal for at least some period of time.

#### Fugitive emissions cause rapid massive warming – building up alternatives to fossil fuels is key

Joe Romm, editor of the award winning energy policy blog Climate Progress, 1-2-2013, “Bridge To Nowhere? NOAA Confirms High Methane Leakage Rate Up To 9% From Gas Fields, Gutting Climate Benefit,” Think Progress, http://thinkprogress.org/climate/2013/01/02/1388021/bridge-to-nowhere-noaa-confirms-high-methane-leakage-rate-up-to-9-from-gas-fields-gutting-climate-benefit/

Researchers with the National Oceanic and Atmospheric Administration (NOAA) have reconfirmed earlier findings of high rates of methane leakage from natural gas fields. If these findings are replicated elsewhere, they would utterly vitiate the climate benefit of natural gas, even when used to switch off coal. Indeed, if the previous findings — of 4% methane leakage over a Colorado gas field — were a bombshell, then the new measurements reported by the journal Nature are thermonuclear: … the research team reported new Colorado data that support the earlier work, as well as preliminary results from a field study in the Uinta Basin of Utah suggesting even higher rates of methane leakage — an eye-popping 9% of the total production. That figure is nearly double the cumulative loss rates estimated from industry data — which are already higher in Utah than in Colorado. The Uinta Basin is of particular interest because fracking has increased there over the past decade. How much methane leaks during the entire lifecycle of unconventional gas has emerged as a key question in the fracking debate. Natural gas is mostly methane (CH4). And methane is a far more potent greenhouse gas than (CO2), which is released when any hydrocarbon, like natural gas, is burned — 25 times more potent over a century and 72 to 100 times more potent over a 20-year period. Even without a high-leakage rate for shale gas, we know that “Absent a Serious Price for Global Warming Pollution, Natural Gas Is A Bridge To Nowhere.” That was first demonstrated by the International Energy Agency in its big June 2011 report on gas — see IEA’s “Golden Age of Gas Scenario” Leads to More Than 6°F Warming and Out-of-Control Climate Change. That study — which had both coal and oil consumption peaking in 2020 — made abundantly clear that if we want to avoid catastrophic warming, we need to start getting off of all fossil fuels. A March 2012 study by climatologist Ken Caldeira and tech guru Nathan Myhrvold came to a similar conclusion using different methodology (see “You Can’t Slow Projected Warming With Gas, You Need ‘Rapid and Massive Deployment’ of Zero-Carbon Power“). They found that even if you could switch entirely over to natural gas in four decades, you “won’t see any substantial decrease in global temperatures for up to 250 years. There’s almost no climate value in doing it.” And that was using conventional (i.e. low) leakage rates. But the leakage rate does matter. A major 2011 study by Tom Wigley of the Center for Atmospheric Research (NCAR) concluded: The most important result, however, in accord with the above authors, is that, unless leakage rates for new methane can be kept below 2%, substituting gas for coal is not an effective means for reducing the magnitude of future climate change. Wigley, it should be noted, was looking at the combined warming impact from three factors — from the methane leakage, from the gas plant CO2 emissions, and from the drop in sulfate aerosols caused by switching out coal for gas. In a country like the United States, which strongly regulates sulfate aerosols, that third factor is probably much smaller. Of course, in countries like China and India, it would be a big deal. An April 2012 study found that a big switch from coal to gas would only reduce “technology warming potentials” by about 25% over the first three decades — far different than the typical statement that you get a 50% drop in CO2 emissions from the switch. And that assumed a total methane leakage of 2.4% (using EPA’s latest estimate). The study found that if the total leakage exceeds 3.2% “gas becomes worse for the climate than coal for at least some period of time.” Leakage of 4%, let alone 9%, would call into question the value of unconventional gas as any sort of bridge fuel. Colm Sweeney, the head of the aircraft program at NOAA’s Earth System Research Laboratory, who led the study’s aerial component, told Nature: “We were expecting to see high methane levels, but I don’t think anybody really comprehended the true magnitude of what we would see.” The industry has tended kept most of the data secret while downplaying the leakage issue. The Environmental Defense Fund (EDF) is working with the industry to develop credible leakage numbers in a variety of locations.

#### Methane release is insulated from the warming debate – unique threat

Clean Energy Educational Trust, energy and environmental analysts, 2001, “Runaway Methane Global Warming,” Hydrogen NOW! Journal, http://www.hydrogen.co.uk/h2\_now/journal/articles/3\_Methane.htm

Core samples taken from old ocean sediment layers have been used to trace back in time the climate changes that have occurred over the past tens of millions of years. By analysing the incidence of different fossil shell remains of sea creatures occurring in these sediments it is possible to track the changes in the sea water temperatures and levels of atmospheric CO2 occurring at the time the shells were formed and deposited. These shells contain carbon from the CO2 in the atmosphere which was dissolved in the sea water in which the creatures lived just as takes place today. From these records it appears that there have been short periods of only a few hundred years in the geological past when rapid increases of the Earth's temperature have occurred superimposed on top of the rise and fall of average temperatures over the longer term. For these short periods temperature rises of up to 8 degrees centigrade appear to have occurred on top of existing long term rises of 5 to 7 degrees to give temperatures up to 15 degrees centigrade warmer than today. Temperatures then fell back to the long term trend, the whole rise and fall only lasting a few hundred years. The most likely cause of this rapid global warming over such a short period is the release of methane into the atmosphere. Methane is 60 times more powerful than CO2 as a greenhouse gas but only remains in the atmosphere for about ten years and so looses it's greenhouse effect quickly compared to CO2 which remains in the atmosphere for 100 years. CO2 would not be available in sufficient quantities to achieve the rapid warming and if CO2 was the cause then the raised temperatures would last a lot longer.

#### Rapid climate shifts cause extinction

Max Mcclure, staff writer, 6-7-2012, “Earth may be approaching 'tipping point,' Stanford scientist says,” Stanford University News, http://news.stanford.edu/news/2012/june/earth-tipping-point-060712.html

It's already established that global biological systems are capable of very rapid, wholesale shifts. Of the five major extinction events in Earth's history, at least four of them were accompanied by this kind of critical transition. Global conditions that had remained relatively stable for millions of years changed dramatically over a period lasting less than 5 percent of that time.¶ There's reason to believe that "pronounced change" in "assemblages of species," as the paper puts it – such as extinction events – are a reliable marker of these shifts. And we happen to be in the middle of an ongoing human-driven mass extinction.¶ The litany of ways in which humans have altered the Earth's environment is well known. But why do these scientists now believe that we are moving toward a major, irreversible shift?¶ "There's the idea that, once you have more than 50 percent of wholesale disturbance in a given ecological system, major disturbance in the rest of the system will inevitably follow," said Hadly, who is also a senior fellow at the Stanford Woods Institute for the Environment.¶ L.A. Cicero¶ Professor Elizabeth Hadly¶ About 43 percent of Earth's land has already been converted to agricultural or urban use and, if current trends continue, is expected to reach the 50 percent mark by 2025. By 2060, using current trends, the number will be 70 percent.¶ By comparison, the last critical shift Earth underwent was the end of the last Ice Age. That famously dramatic example of climate change only involved ice melting from 30 percent of Earth's surface, and it resulted in a major transition in global climatic conditions and the distribution of life on the planet.¶ No escape¶ What Hadly saw in Yellowstone suggests these global shifts may already be affecting isolated, local environments.¶ "As an ecologist, I was trained to measure changes on a local or a regional level – looking at changes in a 1-by-1-meter plot," said Hadly. "Now, there's a heck of a lot of change in that 1-meter plot that has nothing to do with local processes."¶ The global drivers that are working their way into every corner of the planet all have humans behind the wheel. Human population growth and increased resource consumption mean that anywhere from 20 to 40 percent of the planet's energy produced by living things now goes to support human society.¶ The ecosystems that do survive are becoming more homogeneous and simpler – a combination of human-introduced species and habitat degradation and fragmentation.¶ "We're fairly naïve in managing for new combinations of species that will exist," Hadly said, "in part because we usually anticipate ecosystem change on a species-by-species basis."¶ The human connection¶ Although the exact nature of Earth's next state is unpredictable, the researchers expect it to resemble an accelerated version of these already-in-motion processes.¶ These shifts are potentially disastrous for humanity as well.¶ "Citizens of wealthy countries like the U.S. are less aware of catastrophic shifts in ecosystem services because we have the ability to cobble together short-term fixes that mask the global trend," said Hadly. "But other countries aren't so buffered." In a world marked by water shortages and climate change, "we simply aren't yet equipped with a flexible intergovernmental structure necessary to manage for this future."

#### Price spikes are inevitable

Rod Adams, Publisher of Atomic insights. Was in the Navy for 33 years. Spent time at the Naval Academy. Has experience designing and running small nuclear plants, 1-13-2013, “Correcting a journalist’s excessive pessimism about US nuclear industry prospects,” Atomic Insights, http://atomicinsights.com/2013/01/correcting-a-journalists-excessive-pessimism-about-us-nuclear-industry-prospects.html

Though we are all having some difficulty competing against today’s North American natural gas prices, many of us have long enough memories to recall the late 1990s. During the years from 1995-2000 the natural gas industry and its mouthpieces were loudly proclaiming that cheap gas was going to be around for a long time. During those years, natural gas cost about $2.00 per MMBTU. By the summer of 2008, it cost 7 times as much, averaging about $14.00 per MMBTU and spiking to far higher prices at certain times when the weather was bad. The gas industry tells customers that will not happen again; I hear a different story when I listen to major gas companies quarterly earnings calls with investors and analysts. We are well aware of the fact that prices in North America are substantially lower than world market prices; we know that the natural gas industry is working diligently to develop the capability to move gas from one market to another to take advantage of those price differentials. That capability will inevitably result in a leveling of prices around the world; they may fall in some high-priced markets, but they are likely to rise in the low-priced North American markets. That is a simple concept that nearly everyone should understand.

#### Stable energy prices are key to manufacturing

Shelly Schwartz, staff writer, 6-20-2012, “Can the Natural Gas Sector Save the US Economy?” CNBC, http://www.cnbc.com/id/47280026/Can\_the\_Natural\_Gas\_Sector\_Save\_the\_US\_Economy

Like most commodities, natural gas has been prone to dramatic price swings for decades, creating cost uncertainty for industries that rely on such fuel as an energy source or feedstock. As a result of current excess supply, however, the price of natural gas in North America has fallen dramatically to about $2.20 per thousand cubic feet (mcf), a quarter of its record high of $8.86 in 2008. Domestically, analysts expect natural gas prices to average $3.50 per mcf for at least the next five years. By comparison, Europe and Asia, which use naphtha, a more expensive oil-based feedstock, are still paying up to $17 per mcf. According to the IHS report, low and stable gas prices in the U.S. are contributing to a 10 percent reduction in electricity costs to consumers and a 1.1 percent increase in the level of 2012 GDP. Perhaps more importantly, it is encouraging manufacturers to expand operations in the U.S., building new production facilities, or reopen plants that were shuttered during the recession. The American Chemistry Council estimates that petrochemical companies and other manufacturers will spend upwards of $25 billion over the next five years on the more than 30 major domestic projects currently under development. Natural Gas Among them: Royal Dutch Shell, ExxonMobil [XOM 91.92 0.40 (+0.44%) ], Dow Chemical [DOW 30.26 -0.62 (-2.01%) ], and Chevron Phillips Chemical, a joint venture of Chevron [CVX 117.80 -0.05 (-0.04%) ] and Phillips 66 [PSX 46.82 1.04 (+2.27%) ] , which is building a $5 billion ethane facility in Baytown, Texas, that should be operational in 2017. “This is a game changer because it’s leading to an industrial renaissance,” says IHS VP John Larson. “Our manufacturing sector is recovering because they are now able to compete on energy prices where they haven’t been able to compete in the global market on labor prices or taxes.” Lower costs, of course, lead to lower prices for consumers — and higher demand for products made in the U.S. That spurs manufacturers to hire more workers. A 2011 PricewaterhouseCoopers report estimates that U.S. chemical, metal and industrial manufacturers could employ approximately 1 million more workers by 2025 due to benefits from affordable energy and demand for products used to extract natural gas. “There’s a silent oil and gas boom going on in this country,” says Kevin Swift, chief economist for the American Chemistry Council. “Eight years ago, everyone was writing off the U.S. petrochemical industry, but our competitiveness has improved so much in terms of the global cost curve that the U.S. and Canada are now second only to the Middle East.”

#### Manufacturing isn’t resilient – could totally collapse

Arvind Kaushal et al, partner with Booz and Co, Thomas Mayor, senior executive advisor, Patricia Riedel, principal at Booz and Co. Fall 2011, "Manufacturing’s Wake-Up Call" Booz and Co. http://booz.com/media/file/sb64-11306-Manufacturing~’s-Wake-Up-Call.pdf

Both the optimists and the pessimists are partially correct. U.S. manufacturing is at a moment of truth. Currently, U.S. factories competitively produce about 75 percent of the products that the nation consumes. A series of identifiable smart actions and choices by business leaders, educators, and policymakers could lead to a robust, manufacturing-driven economic future and push that figure up to 95 percent. Alternatively, if the U.S. manufacturing sector remains neglected, its output could fall by half, meeting less than 40 percent of the nation’s demand, and U.S. manufacturing capabilities could then erode past the point of no return.

#### Location of manufacturing is key – the country that makes the stuff benefits

John Bryson, Secretary of Commerce, January 2012, “The Competitiveness and Innovative

Capacity of the United States,” US Department of Commerce.

A strong manufacturing sector is also crucial because successful innovation in many sectors is closely linked to the ability to manufacture products as innovative methods and ideas are generated and perfected through the process of making things. In the recent Report to the President on Ensuring American Leadership in Advanced Manufacturing,5 the President’s Council of Advisors on Science and Technology (PCAST) and the President’s Innovation and Technology Advisory Committee (PITAC) emphasize the critical importance of advanced manufacturing in driving knowledge production and innovation in the United States. The PCAST researched the current state of manufacturing and concluded that U.S. leadership in manufacturing is declining and that this is detrimental to the well‐being of the nation overall. Manufacturing companies in the United States are responsible for over two‐thirds of the industrial R&D6 and employ the majority of domestic scientists and engineers.7 Furthermore, manufacturing R&D is the dominant source of innovative new service‐sector technologies,8 hence its benefits reach beyond the manufacturing arena. The colocation of manufacturing, research, and other sectors can also be important. In its recent report the PCAST states: “Proximity is important in fostering innovation. When different aspects of manufacturing—from R&D to production to customer delivery—are located in the same region, they breed efficiencies in knowledge transfer that allow new technologies to develop and businesses to innovate.” 9 Thus, even if R&D facilities are kept in the United States, the relocation of manufacturing facilities overseas may limit the United States’ ability to innovate. Finally, an innovative and secure domestic manufacturing base is critical to national security. An inability to produce domestically the advanced defense systems of the modern military would put the national security of the United States at risk. As its military comes to rely more heavily on complex and advanced technology systems, it is important that the United States retain the manufacturing capacity and knowledge necessary to produce these goods. Our continued security not only rests on the ability to produce military products, but we must also consider how the sourcing of all critical infrastructure components, from communications equipment to power generation, affects our ability to protect against potentially catastrophic supply chain disruptions.

#### Challengers are building up – manufacturing key to overall military superiority and deterrence

Mackenzie Eaglen et al, 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, January 2012, "The Arsenal of Democracy and How to Preserve It: Key Issues in Defense Industrial Policy, Brookings, http://www.brookings.edu/~/media/research/files/papers/2012/1/26%20defense%20industrial%20base/0126\_defense\_industrial\_base\_ohanlon

Yet there are severe challenges that could result to the nation’s security interests even with 10 percent cutbacks. Despite the likely potential of lesser resources, the demand side of the equation does not seem likely to grow easier. The international security environment is challenging and complex. China’s economic, political and now military rise continues. Its direction is uncertain, but it has already raised tension, especially in the South China Sea. Iran’s ambitions and machinations remain foreboding, with its nuclear plans entering a new phase of both capability but also crisis. North Korea is all the more uncertain with a leadership transition, but has a history of brinkmanship and indeed even the occasional use of force against the South, not to mention nuclear weapons-related activities that raise deep concern. And the hopeful series of revolutions in the broader Arab world in 2011, while inspiring at many levels, also seem likely to raise uncertainty in the broader Middle East. Revolutions are inherently unpredictable and often messy geostrategic events. On top of these remain commitments in Afghanistan and beyond and the frequent U.S. military role in humanitarian disaster relief. Thus, there are broad challenges for American defense planners as they try to address this challenging world with fewer available resources. 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. While procurement budgets have finally, in recent years, reached their historic norms as a percent of the overall defense budget, the legacy of the 1990s procurement “holiday” remains real. In that period, the United States as a matter of policy bought much less equipment than it would normally, enjoying the fruits of the 1980s buildup as it sought to reduce defense spending. But Reagan-era weaponry is wearing out, and the recent increase in procurement spending has not lasted long enough to replenish the nation’s key weapons arsenals with new weaponry. The last decade of procurement policy focused more on filling certain gaps in counterinsurgency capabilities than replacing the mainline weapons programs that make up the bulk of conventional capabilities. Meanwhile, the main elements of DoD’s weapons inventories—fighter jets, armored vehicles, surface vessels and submarines—continue to age. We often say that, in today’s American armed forces, people are our most cherished commodity and greatest asset. That is certainly true at one level, through the dedication and excellence shown by our brave men and women in uniform. But it is also true that adjusting the personnel size of the military up or down has been done with success multiple times, and seems likely to happen again. By contrast, scientific and manufacturing excellence in the defense space is not something easily moved up and down. Today’s industrial capabilities took decades to build and would be hard to restore if 3 lost (Great Britain’s difficulty restoring its ability to build nuclear submarines is a frequently cited example.)

#### Heg solves extinction

Stephen Brooks, associate prof of government at Dartmouth, William Wohlforth, prof of government at Dartmouth at Dartmouth, and John Ikenberry, Prof of politics and International Affairs at Princeton, Jan/Feb 2013, “Lead Forward,” Foreign Affairs, Vol. 92 Issue 1, p130-142, 13p, 1, Ebsco.

Of course, even if it is true that the costs of deep engagement fall far below what advocates of retrenchment claim, they would not be worth bearing unless they yielded greater benefits. In fact, they do. The most obvious benefit of the current strategy is that it reduces the risk of a dangerous conflict. The United States' security commitments deter states with aspirations to regional hegemony from contemplating expansion and dissuade U.S. partners from trying to solve security problems on their own in ways that would end up threatening other states. Skeptics discount this benefit by arguing that U.S. security guarantees aren't necessary to prevent dangerous rivalries from erupting. They maintain that the high costs of territorial conquest and the many tools countries can use to signal their benign intentions are enough to prevent conflict. In other words, major powers could peacefully manage regional multipolarity without the American pacifier. But that outlook is too sanguine. If Washington got out of East Asia, Japan and South Korea would likely expand their military capabilities and go nuclear, which could provoke a destabilizing reaction from China. It's worth noting that during the Cold War, both South Korea and Taiwan tried to obtain nuclear weapons; the only thing that stopped them was the United States, which used its security commitments to restrain their nuclear temptations. Similarly, were the United States to leave the Middle East, the countries currently backed by Washington--notably, Israel, Egypt, and Saudi Arabia--might act in ways that would intensify the region's security dilemmas. There would even be reason to worry about Europe. Although it's hard to imagine the return of great-power military competition in a post-American Europe, it's not difficult to foresee governments there refusing to pay the budgetary costs of higher military outlays and the political costs of increasing EU defense cooperation. The result might be a continent incapable of securing itself from threats on its periphery, unable to join foreign interventions on which U.S. leaders might want European help, and vulnerable to the influence of outside rising powers. Given how easily a U.S. withdrawal from key regions could lead to dangerous competition, advocates of retrenchment tend to put forth another argument: that such rivalries wouldn't actually hurt the United States. To be sure, few doubt that the United States could survive the return of conflict among powers in Asia or the Middle East--but at what cost? Were states in one or both of these regions to start competing against one another, they would likely boost their military budgets, arm client states, and perhaps even start regional proxy wars, all of which should concern the United States, in part because its lead in military capabilities would narrow. Greater regional insecurity could also produce cascades of nuclear proliferation as powers such as Egypt, Saudi Arabia, Japan, South Korea, and Taiwan built nuclear forces of their own. Those countries' regional competitors might then also seek nuclear arsenals. Although nuclear deterrence can promote stability between two states with the kinds of nuclear forces that the Soviet Union and the United States possessed, things get shakier when there are multiple nuclear rivals with less robust arsenals. As the number of nuclear powers increases, the probability of illicit transfers, irrational decisions, accidents, and unforeseen crises goes up. The case for abandoning the United States' global role misses the underlying security logic of the current approach. By reassuring allies and actively managing regional relations, Washington dampens competition in the world s key areas, thereby preventing the emergence of a hothouse in which countries would grow new military capabilities. For proof that this strategy is working, one need look no further than the defense budgets of the current great powers: on average, since 1991 they have kept their military expenditures as A percentage of GDP to historic lows, and they have not attempted to match the United States' top-end military capabilities. Moreover, all of the world's most modern militaries are U.S. allies, and the United States' military lead over its potential rivals .is by many measures growing. On top of all this, the current grand strategy acts as a hedge against the emergence regional hegemons. Some supporters of retrenchment argue that the U.S. military should keep its forces over the horizon and pass the buck to local powers to do the dangerous work of counterbalancing rising regional powers. Washington, they contend, should deploy forces abroad only when a truly credible contender for regional hegemony arises, as in the cases of Germany and Japan during World War II and the Soviet Union during the Cold War. Yet there is already a potential contender for regional hegemony--China--and to balance it, the United States will need to maintain its key alliances in Asia and the military capacity to intervene there. The implication is that the United States should get out of Afghanistan and Iraq, reduce its military presence in Europe, and pivot to Asia. Yet that is exactly what the Obama administration is doing. MILITARY DOMINANCE, ECONOMIC PREEMINENCE Preoccupied with security issues, critics of the current grand strategy miss one of its most important benefits: sustaining an open global economy and a favorable place for the United States within it. To be sure, the sheer size of its output would guarantee the United States a major role in the global economy whatever grand strategy it adopted. Yet the country's military dominance undergirds its economic leadership. In addition to protecting the world economy from instability, its military commitments and naval superiority help secure the sea-lanes and other shipping corridors that allow trade to flow freely and cheaply. Were the United States to pull back from the world, the task of securing the global commons would get much harder. Washington would have less leverage with which it could convince countries to cooperate on economic matters and less access to the military bases throughout the world needed to keep the seas open. A global role also lets the United States structure the world economy in ways that serve its particular economic interests. During the Cold War, Washington used its overseas security commitments to get allies to embrace the economic policies it preferred--convincing West Germany in the 1960s, for example, to take costly steps to support the U.S. dollar as a reserve currency. U.S. defense agreements work the same way today. For example, when negotiating the 2011 free-trade agreement with South Korea, U.S. officials took advantage of Seoul's desire to use the agreement as a means of tightening its security relations with Washington. As one diplomat explained to us privately, "We asked for changes in labor and environment clauses, in auto clauses, and the Koreans took it all." Why? Because they feared a failed agreement would be "a setback to the political and security relationship." More broadly, the United States wields its security leverage to shape the overall structure of the global economy. Much of what the United States wants from the economic order is more of the same: for instance, it likes the current structure of the World Trade Organization and the International Monetary Fund and prefers that free trade continue. Washington wins when U.S. allies favor this status quo, and one reason they are inclined to support the existing system is because they value their military alliances. Japan, to name one example, has shown interest in the Trans-Pacific Partnership, the Obama administration's most important free-trade initiative in the region, less because its economic interests compel it to do so than because Prime Minister Yoshihiko Noda believes that his support will strengthen Japan's security ties with the United States. The United States' geopolitical dominance also helps keep the U.S. dollar in place as the world's reserve currency, which confers enormous benefits on the country, such as a greater ability to borrow money. This is perhaps clearest with Europe: the EU'S dependence on the United States for its security precludes the EU from having the kind of political leverage to support the euro that the United States has with the dollar. As with other aspects of the global economy, the United States does not provide its leadership for free: it extracts disproportionate gains. Shirking that responsibility would place those benefits at risk. CREATING COOPERATION What goes for the global economy goes for other forms of international cooperation. Here, too, American leadership benefits many countries but disproportionately helps the United States. In order to counter transnational threats, such as terrorism, piracy, organized crime, climate change, and pandemics, states have to work together and take collective action. But cooperation does not come about effortlessly, especially when national interests diverge. The United States' military efforts to promote stability and its broader leadership make it easier for Washington to launch joint initiatives and shape them in ways that reflect U.S. interests. After all, cooperation is hard to come by in regions where chaos reigns, and it flourishes where leaders can anticipate lasting stability. U.S. alliances are about security first, but they also provide the political framework and channels of communication for cooperation on nonmilitary issues. NATO, for example, has spawned new institutions, such as the Atlantic Council, a think tank, that make it easier for Americans and Europeans to talk to one another and do business. Likewise, consultations with allies in East Asia spill over into other policy issues; for example, when American diplomats travel to Seoul to manage the military alliance, they also end up discussing the Trans-Pacific Partnership. Thanks to conduits such as this, the United States can use bargaining chips in one issue area to make progress in others. The benefits of these communication channels are especially pronounced when it comes to fighting the kinds of threats that require new forms of cooperation, such as terrorism and pandemics. With its alliance system in place, the United States is in a stronger position than it would otherwise be to advance cooperation and share burdens. For example, the intelligence-sharing network within NATO, which was originally designed to gather information on the Soviet Union, has been adapted to deal with terrorism. Similarly, after a tsunami in the Indian Ocean devastated surrounding countries in 2004, Washington had a much easier time orchestrating a fast humanitarian response with Australia, India, and Japan, since their militaries were already comfortable working with one another. The operation did wonders for the United States' image in the region. The United States' global role also has the more direct effect of facilitating the bargains among governments that get cooperation going in the first place. As the scholar Joseph Nye has written, "The American military role in deterring threats to allies, or of assuring access to a crucial resource such as oil in the Persian Gulf, means that the provision of protective force can be used in bargaining situations. Sometimes the linkage may be direct; more often it is a factor not mentioned openly but present in the back of statesmen's minds." THE DEVIL WE KNOW Should America come home? For many prominent scholars of international relations, the answer is yes--a view that seems even wiser in the wake of the disaster in Iraq and the Great Recession. Yet their arguments simply don't hold up. There is little evidence that the United States would save much money switching to a smaller global posture. Nor is the current strategy self-defeating: it has not provoked the formation of counterbalancing coalitions or caused the country to spend itself into economic decline. Nor will it condemn the United States to foolhardy wars in the future. What the strategy does do is help prevent the outbreak of conflict in the world's most important regions, keep the global economy humming, and make international cooperation easier. Charting a different course would threaten all these benefits.

#### Nuclear build up diversifies energy production – insulates against price spikes

Christine Todd Whitman, former EPA administrator and New Jersey governor, is the co-chair of the Clean and Safe Energy Coalition which promotes the inclusion of nuclear power as part of a clean energy portfolio, 5-9-2012, “It's dangerous to depend on natural gas,” Fortune, http://tech.fortune.cnn.com/2012/05/09/christine-whitman-nuclear-energy/

The United States needs an "all of the above" energy strategy that focuses on low-carbon electricity sources that will lower energy costs, reduce dependency on foreign fuel sources and promote clean electricity. This is a prudent strategy to help drive American manufacturing and transportation networks of the future. Most importantly, this approach can put the country on a sustainable path toward long-term economic growth. While today's rock-bottom natural gas prices are attractive, an unbalanced dependence on natural gas in the electricity sector would put Americans at risk, both economically and in terms of longer term energy security. While many look at energy prices from today's lens, successful energy policy requires a long view that promotes fuel diversity but doesn't pick technology winners; it preserves our air, land and water and is affordable for consumers. We need only look at the volatile history of natural gas prices. Consider the shift from the low, stable prices of the 1990s to the record-high rates and wild supply fluctuations of the mid-2000s. We should take advantage of our domestic energy resources, recognizing that today's natural gas market is still vulnerable. The present oversupply of natural gas opens opportunities for exports into foreign markets at prices two-to-three times higher. If demand from other countries increases as they meet growing energy demand, it will cause our prices to align with higher world prices. MORE: 8 characteristics of Green Insurgents During my tenure as governor of a state that relies heavily on nuclear energy, I can attest to the cost effectiveness of nuclear fuel and the protection it offers against price spikes in natural gas or future environmental controls such as a cost on carbon. Nuclear energy doesn't emit any greenhouse gases or controlled pollutants while producing power and it is affordable, predictable and efficient. Moreover, a nuclear power plant with a footprint of one square mile generates the same amount of energy as 20 square miles of solar panels or 2,400 wind turbines spread out across 235 square miles. Uranium fuel is abundant and costs an average of 2.14 cents per kilowatt-hour, compared to 4.86 cents per kilowatt-hour for natural gas. A nuclear plant typically generates electricity at 90 percent capacity—an electric sector best and twice that of combined cycle natural gas plants at 40 to 45 percent capacity. Clean energy production costs, which include fuel, operations and maintenance, run nearly equal for nuclear and natural gas. A new nuclear plant with state or federal support can generate power at $84-$91 per megawatt-hour with zero carbon emissions. Natural gas plants produce power at today's gas prices for $56-$71 per megawatt-hour, but still emit greenhouse gases at about half the rate of coal plants. Assuming a carbon price of $30 per ton, natural gas power generation costs rise to about $74-$89 per megawatt-hour. At Fortune's Brainstorm Green conference, I noted a March 2012 Gallup poll that found 57% of Americans support nuclear energy. This support reflects the momentum behind nuclear energy's expansion, including recent U.S. Nuclear Regulatory Commission approval of four reactors in Georgia and South Carolina. New large-scale electricity is needed today in the fast-growing Southeast electric grid because of business expansion and population growth. These new reactors will serve the needs of 3 million homes while creating thousands of high-paying jobs. On average, a nuclear facility creates up to 3,500 construction jobs and 400 to 700 operation positions. MORE: Green businesses: Don't abandon Washington According to the Bureau of Labor Statistics, nuclear energy accounted for 54% of green jobs in the utility sector in 2010, supplying the most green goods-and-services jobs—35,800—in private sector electricity generation. For example, 90% of the components for the Westinghouse reactors being built in Georgia and South Carolina will be manufactured domestically. As the dash to gas accelerates across America, I am encouraged by the support from government and industry leaders for nuclear energy as part of a diverse electricity supply. Secretary of Energy Steven Chu recently restated the administration's support for nuclear energy to be developed alongside renewable energy sources and natural gas. Kevin Marsh, president and CEO of Columbia, S.C.-based SCANA, which is developing two advanced designed Westinghouse reactors, said a balanced energy portfolio is best. "You don't want to be all gas, all nuclear or all coal." Fuel diversity is one of the great strengths of the United States' electric supply system, and we must be mindful of that lesson. In the coming years, we will need hundreds of new power plants from a variety of fuel sources along with significant investment in the smart grid that will move that power to homes, businesses and an evolving electrified transportation system. Nuclear energy is the only large-scale, carbon-free electricity source, and it must be among these energy choices if we are to secure a safe and sustainable portfolio of energy resources.

### Prolif Advantage

#### Nuclear leadership is declining – only revitalizing the nuclear industry gives us bargaining position and solves prolif

Michael Wallace and Sarah Williams, Michael is Senior Adviser at the U.S. Nuclear Energy Project at CSIS, Sarah is a Nuclear Policy Analyst at the Partnership for Global Security at CSIS, “Nuclear Energy in America: Preventing its Early Demise”, October 2012, <http://csis.org/files/publication/120417_gf_wallace_williams.pdf>

America’s nuclear energy industry is in decline. Low natural gas prices, financing hurdles, new safety and security requirements, failure to resolve the waste issue and other factors are hastening the day when existing reactors become uneconomic, making it virtually impossible to build new ones. Two generations after the United States took this wholly new and highly sophisticated technology from laboratory experiment to successful commercialization, our nation is in danger of losing an industry of unique strategic importance, unique potential for misuse, and unique promise for addressing the environmental and energy security demands of the future. The pace of this decline, moreover, could be more rapid than most policymakers and stakeholders anticipate. With 104 operating reactors and the world’s largest base of installed nuclear capacity, it has been widely assumed that the United States—even without building many new plants— would continue to have a large presence in this industry for some decades to come, especially if existing units receive further license extensions. Instead, current market conditions are such that growing numbers of these units are operating on small or even negative profit margins and could be retired early. Meanwhile, China, India, Russia, and other countries are looking to significantly expand their nuclear energy commitments. By 2016, China could have 50 nuclear power plants in operation, compared with only 14 in 2011. India could add 8 new plants and Russia 10 in the same time frame. These trends are expected to accelerate out to 2030, by which time China, India, and Russia could account for nearly 40 percent of global nuclear generating capacity. Meanwhile, several smaller nations, mostly in Asia and the Middle East, are planning to get into the nuclear energy business for the first time. In all, as many as 15 new nations could have this technology within the next two decades. Meanwhile, America’s share of global nuclear generation is expected to shrink, from about 25 percent today to about 14 percent in 2030, and—if current trends continue—to less than 10 percent by mid-century. With the center of gravity for global nuclear investment shifting to a new set of players, the United States and the international community face a difficult set of challenges: stemming the spread of nuclear weapons-usable materials and know-how; preventing further catastrophic nuclear accidents; providing for safe, long-term nuclear waste management; and protecting U.S. energy security and economic competitiveness. In this context, federal action to reverse the American nuclear industry’s impending decline is a national security imperative. The United States cannot afford to become irrelevant in a new nuclear age. Our nation’s commercial nuclear industry, its military nuclear capabilities, and its strong regulatory institutions can be seen as three legs of a stool. All three legs are needed to support America’s future prosperity and security and to shape an international environment that is conducive to our long-term interests. Three specific aspects of U.S. leadership are particularly important. First, managing the national and global security risks associated with the spread of nuclear technology to countries that don’t necessarily share the same perspective on issues of nonproliferation and nuclear security or may lack the resources to implement effective safeguards in this area. An approach that relies on influence and involvement through a viable domestic industry is likely to be more effective and less expensive than trying to contain these risks militarily. Second, setting global norms and standards for safety, security, operations, and emergency response. As the world learned with past nuclear accidents and more recently with Fukushima, a major accident anywhere can have lasting repercussions everywhere. As with nonproliferation and security, America’s ability to exert leadership and influence in this area is directly linked to the strength of our domestic industry and our active involvement in the global nuclear enterprise. A strong domestic civilian industry and regulatory structure have immediate national security significance in that they help support the nuclear capabilities of the U.S. Navy, national laboratories, weapons complex, and research institutions. Third, in the past, the U.S. government could exert influence by striking export agreements with countries whose regulatory and legal frameworks reflected and were consistent with our own nonproliferation standards and commitments. At the same time, our nation set the global standard for effective, independent safety regulation (in the form of the Nuclear Regulatory Commission), led international efforts to reduce proliferation risks (through the 1970 NPT Treaty and other initiatives), and provided a model for industry self-regulation. The results were not perfect, but America’s institutional support for global nonproliferation goals and the regulatory behaviors it modeled clearly helped shape the way nuclear technology was adopted and used elsewhere around the world. This influence seems certain to wane if the United States is no longer a major supplier or user of nuclear technology. With existing nonproliferation and safety and security regimes looking increasingly inadequate in this rapidly changing global nuclear landscape, American leadership and leverage is more important and more central to our national security interests than ever. To maintain its leadership role in the development, design, and operation of a growing global nuclear energy infrastructure, the next administration, whether Democrat or Republican, must recognize the invaluable role played by the commercial U.S. nuclear industry and take action to prevent its early demise.

#### Strong nuclear industry key to global leadership – loan guarantees are critical

Olga Belogolova, staff writer, 7-19-2012, “U.S. Nuclear Industry Seen Needing a Boost,” National Journal Daily, Lexis.

A robust nuclear-energy industry should be a high priority for the country's energy and national-security policy given the importance of the sector to global nonproliferation, according to a new report released on Thursday by the Bipartisan Policy Center's Nuclear Initiative. Specifically, the United States needs to lead in the licensing and development of new reactors and on safety reforms, management of spent nuclear fuel, the nuclear-export market, and research and development in the nuclear sector, according to the report led by former Sen. Pete Domenici, R-N.M., and former Energy Department Assistant Secretary for Nuclear Energy Warren (Pete) Miller. But leadership on nuclear issues could prove to be a challenge for the United States. Although the country has long led the charge on civilian nuclear power, the combination of a slowed electricity market, the lack of sweeping climate legislation, a natural-gas boom, and last year's Fukushima Daiichi nuclear accident in Japan have created obstacles for the development of new nuclear power in the United States in recent years. While the Nuclear Regulatory Commission this year has approved four new reactors for the Vogtle and Summer nuclear plants in Georgia and South Carolina, respectively, there are likely to only be a few more plants licensed in the United States in the near future. The story is very different on the international level. After Fukushima, countries such as Germany, Italy, Switzerland, and of course Japan have paused or slowed down their nuclear-energy development, but that hasn't stopped the rest of the world. Many other nations such as China, India, South Korea, and Russia have reaffirmed plans to expand their fleets of nuclear reactors, while some countries in the Middle East have even announced plans to develop nuclear energy for the first time. China alone, which has 26 new reactors under development, is expected to account for 40 percent of planned nuclear construction globally. The United States might be a leader now, accounting for nearly one-third of global nuclear generation, but it won't be long before others come out ahead of us, especially given how long it takes to construct new reactors, Domenici and Miller explained. "It will be increasingly difficult for the United States to maintain its technological leadership without some near-term domestic demand for new construction," they write in the report. In order to control the proliferation of nuclear weapons, the United States needs to remain involved in everything that happens to nuclear materials, from the export of nuclear fuel for energy use to the disposal of spent fuel. Given the global picture, Domenici and Miller suggest a shift in U.S. policies in order to ensure that the U.S. nuclear energy program is not stuck at a near-standstill. "Market signals alone are unlikely to result in a diverse fuel mix, so helping to maintain and improve a range of electricity supply options remains a role for federal policy," the two write in the report. "In particular, U.S. policy should be aimed at helping to preserve nuclear energy as an important technology option for near- or longer-term deployment." The vast shale-gas reserves in the United States and new technology to tap them will probably keep natural-gas prices low for the foreseeable future, making financing of more expensive nuclear power more difficult. Federal loan guarantees have long been viewed as crucial to growing the nuclear industry, but the Energy Department has dragged its feet on these conditional loans, especially after the bankruptcy of the federally funded solar firm Solyndra - so much so that some companies have decided not to wait around and see what happens. Southern Company, which is building the first two new reactors to be approved in decades at its Vogtle nuclear plant in Georgia, on Thursday said that it is now considering doing so without federal support. The company had been waiting for an $8.33 billion loan guarantee to build the two new reactors, but Southern CEO Tom Fanning told Reuters on Thursday that talks with DOE were going slowly and they might not be willing to wait any longer.

#### Prolif incentivizes aggression – that causes regional instability and increased conventional wars which escalate to global nuclear war

Matthew Kroenig, Professor of Government at Georgetown and Fellow at CFR specializing in Nuclear Security, 5-26-2012, “The History of Proliferation Optimism: Does It Have A Future?” Nonproliferation Policy Education Center, http://www.npolicy.org/article.php?aid=1182andrtid=2

Regional instability: The spread of nuclear weapons also emboldens nuclear powers contributing to regional instability. States that lack nuclear weapons need to fear direct military attack from other states, but states with nuclear weapons can be confident that they can deter an intentional military attack, giving them an incentive to be more aggressive in the conduct of their foreign policy. In this way, nuclear weapons provide a shield under which states can feel free to engage in lower-level aggression. Indeed, international relations theories about the “stability-instability paradox” maintain that stability at the nuclear level contributes to conventional instability.[64] Historically, we have seen that the spread of nuclear weapons has emboldened their possessors and contributed to regional instability. Recent scholarly analyses have demonstrated that, after controlling for other relevant factors, nuclear-weapon states are more likely to engage in conflict than nonnuclear-weapon states and that this aggressiveness is more pronounced in new nuclear states that have less experience with nuclear diplomacy.[65] Similarly, research on internal decision-making in Pakistan reveals that Pakistani foreign policymakers may have been emboldened by the acquisition of nuclear weapons, which encouraged them to initiate militarized disputes against India.[66] Currently, Iran restrains its foreign policy because it fears a major military retaliation from the United States or Israel, but with nuclear weapons it could feel free to push harder. A nuclear-armed Iran would likely step up support to terrorist and proxy groups and engage in more aggressive coercive diplomacy. With a nuclear-armed Iran increasingly throwing its weight around in the region, we could witness an even more crisis prone Middle East. And in a poly-nuclear Middle East with Israel, Iran, and, in the future, possibly other states, armed with nuclear weapons, any one of those crises could result in a catastrophic nuclear exchange. Nuclear proliferation can also lead to regional instability due to preventive strikes against nuclear programs. States often conduct preventive military strikes to prevent adversaries from acquiring nuclear weapons. Historically, the United States attacked German nuclear facilities during World War II, Israel bombed a nuclear reactor in Iraq in 1981, Iraq bombed Iran’s Bushehr reactors in the Iran-Iraq War in the 1980s and Iran returned the favor against an Iraqi nuclear plant, a U.S.-led international coalition destroyed Iraq’s nuclear infrastructure in the first Gulf War in 1991, and Israel bombed a Syrian nuclear reactor in 2007. These strikes have not led to extensive conflagrations in the past, but we might not be so lucky in the future. At the time of writing in 2012, the United States and Israel were polishing military plans to attack Iran’s nuclear program and some experts maintain that such a strike could very well lead to a wider war in the Middle East.

#### Prolif is uneven – small arsenals don’t solve

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

#### New prolif causes crises – learning curves and past luck

Francois Heisbourg, Chairman of the International Institute for Strategic Studies, 4-4-2012, “NUCLEAR PROLIFERATION – LOOKING BACK, THINKING AHEAD: HOW BAD WOULD THE FURTHER SPREAD OF NUCLEAR WEAPONS BE?” Nonproliferation Policy Education Center, http://www.npolicy.org/article.php?aid=1171andrtid=2

Nuclear archives, as other sensitive governmental archives, open up usually after an interval of decades and even then with varying levels of culling and redaction. Even oral histories tend to follow this pattern, as ageing witnesses feel freer to speak up. Hence a paradox: when the Soviet-American nuclear confrontation was central to our lives and policies during the Cold War, we didn’t how bad things really were; now that we are beginning to know, there is little public interest given the disappearance of the East-West contest. Yet there are lessons of general interest which can be summarized as follows: 1)the Cuban missile crisis brought us much closer to the brink than the acute sense of danger which prevailed at the time, for reasons which are germane to the current situation: massive failures of intelligence on Soviet nuclear preparations and dispositions in Cuba, notably on tactical nukes and on the operational readiness of a number of IRBMs and their warheads; dysfunctional or imperfect command and control arrangements notably vis à vis Soviet submarines), unintentionally mixed signals on each antagonist’s actions). These are effectively laid out in Michael Dobb’s book, “One Minute to Midnight”(14). 2) the safety and security of nuclear forces are subject to potentially calamitous procedural, technical or operational mishaps and miscalculations, somewhat along the lines of what applies to related endeavors (nuclear power and aerospace). Scott Sagan in his “Limits of Safety”(15) provides compelling research on the American Cold War experience. It would be interesting to have a similar treatment on the Soviet experience…Although it can be argued that today’s nuclear arsenals are much smaller and easier to manage reliable, and that the technology for their control has been vastly improved, several facts remain: the US has continued to witness serious procedural lapses in the military nuclear arena (16); the de-emphasis of the importance of nuclear weapons in the US force structure is not conducive to treating them with the respect which is due to their destructive power; other nuclear powers do not necessarily benefit from the same technology and learning curves as the older nuclear states, and notably the US; cheek-to-jowl nuclear postures, which prevailed in the Cuban missile crisis and which help explain why World War III nearly occurred, and which characterize India and Pakistan today. Despite the dearth of detail on Indian and Pakistani nuclear crisis management, we know that the stability of nuclear deterrence between India and Pakistan is by no means a given, with serious risks occurring on several occasions since the mid-1980s(17).

#### Future prolif will be rapid – tech diffusion speeds up the process

CFR 7-5-2012, “The Global Nuclear Nonproliferation Regime,” Council on Foreign Relations, http://www.cfr.org/proliferation/global-nuclear-nonproliferation-regime/p18984

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

#### Prolif begets prolif – history proves

Matthew Kroenig, Professor of Government at Georgetown and Fellow at CFR specializing in Nuclear Security, 5-26-2012, “The History of Proliferation Optimism: Does It Have A Future?” Nonproliferation Policy Education Center, http://www.npolicy.org/article.php?aid=1182andrtid=2

Further proliferation. Nuclear proliferation poses an additional threat to international peace and security because it causes further proliferation. As former Secretary of State George Schultz once said, “proliferation begets proliferation.”[69] When one country acquires nuclear weapons, its regional adversaries, feeling threatened by its neighbor’s new nuclear capabilities, are more likely to attempt to acquire nuclear weapons in response. Indeed, the history of nuclear proliferation can be read as a chain reaction of proliferation. The United States acquired nuclear weapons in response to Nazi Germany’s crash nuclear program. The Soviet Union and China acquired nuclear weapons to counter the U.S. nuclear arsenal. The United Kingdom and France went nuclear to protect themselves from the Soviet Union. India’s bomb was meant to counter China and it, in turn, spurred Pakistan to join the nuclear club. Today, we worry that, if Iran acquires nuclear weapons, other Middle Eastern countries, such as Egypt, Iraq, Turkey, and Saudi Arabia, might desire nuclear capabilities, triggering an arms race in a strategically important and volatile region. Of course, reactive proliferation does not always occur. In the early 1960s, for example, U.S. officials worried that a nuclear-armed China would cause Taiwan, Japan, India, Pakistan, and other states to acquire nuclear weapons.[70] In hindsight, we now know that they were correct in some cases, but wrong in others. Using statistical analysis, Philipp Bleek has shown that reactive proliferation is not automatic, but that rather, states are more likely to proliferate in response to neighbors when three conditions are met 1) there is an intense security rivalry between the two countries, 2) the potential proliferant state does not have a security guarantee from a nuclear-armed patron 3) and the potential proliferant state has the industrial and technical capacity to launch an indigenous nuclear program.[71] In other words, reactive proliferation is real, but it is also conditional. If Iran enters the nuclear club, therefore, it is likely that some, but not all, of the countries that we currently worry about will eventually follow suit and become nuclear powers. We should worry about the spread of nuclear weapons in every case, therefore, because the problem will likely extend beyond that specific case. As Wohlstetter cautioned decades ago, proliferation is not an N problem, but an N+1 problem. Further nuclear proliferation is not necessarily a problem, of course, if the spread of nuclear weapons is irrelevant or even good for international politics as obsessionists and optimists protest. But, as the above discussion makes clear, nuclear proliferation, and the further nuclear proliferation it causes, increases the risk of nuclear war and nuclear terrorism, emboldens nuclear-armed states to be more aggressive, threatens regional stability, constrains U.S. freedom of action, and weakens America’s alliance relationships, giving us all good reason to fear the spread of nuclear weapons.

#### New nuclear capacity is key – slowing investment swamps all alt causes

Pete Domenici, former senator from New Mexico, and Warren F. “Pete” Miller, part time Research Professor at Texas A & M University and former assistant secretary for nuclear energy at the U.S. Department of Energy, July 2012, “Maintaining U.S. Leadership in Global Nuclear Energy Markets,” Bipartisan Policy Center, http://bipartisanpolicy.org/sites/default/files/Leadership%20in%20Nuclear%20Energy%20Markets.pdf

As the world’s largest commercial nuclear operator and dominant weapons state, the United States has traditionally been the clear leader on international nuclear issues. Today, the United States still accounts for approximately one-quarter of commercial nuclear reactors in operation around the world and one-third of global nuclear generation.33 This position is likely to shift in coming decades, as new nuclear investments go forward in other parts of the world while slowing or halting in the United States. In past decades, the United States was also a significant exporter of nuclear materials and technologies, but this dominance too has slowly declined. At present, however, the U.S. safety and security infrastructure and regulatory framework remain without peer and U.S. expertise and guidance on operational and regulatory issues continues to be sought around the world. The domestic nuclear industry established the INPO in the wake of the Three Mile Island accident in 1979 in a collective effort to hold all industry players accountable to the highest standards for safe and reliable commercial operations. Similarly, the NRC is seen as the gold standard for commercial nuclear regulation. As long as other countries seek to learn from the experience and expertise of U.S. firms and regulators, the United States will enjoy greater access to international nuclear programs. A substantial reduction in domestic nuclear energy activities could erode U.S. international standing.

#### Increased prolif ensures nuclear terrorism

Matthew Kroenig, Professor of Government at Georgetown and Fellow at CFR specializing in Nuclear Security, 5-26-2012, “The History of Proliferation Optimism: Does It Have A Future?” Nonproliferation Policy Education Center, http://www.npolicy.org/article.php?aid=1182andrtid=2

Nuclear terrorism. The spread of nuclear weapons also increases the risk of nuclear terrorism.[58] It used to be said that “terrorists want a lot of people watching, not a lot of people dead,” but the terrorist attacks of September 11, 2001 changed expert perceptions of the terrorist threat.[59] September 11th demonstrated that Al Qaeda and other modern terrorist groups are interested in imposing massive casualties and there are few better ways of killing large numbers of civilians than detonating a nuclear weapon in a major metropolitan area. And, while September 11th was one of the greatest tragedies in American history, it would have been much worse had Osama Bin Laden been able to acquire nuclear weapons. Osama Bin Laden declared it a “religious duty” for Al Qaeda to acquire nuclear weapons and radical clerics have issued fatwas declaring it permissible to use nuclear weapons in Jihad against the West.[60] Unlike states, which can be deterred, there is little doubt that if terrorists acquired nuclear weapons, they would use them. Indeed, in recent years, many U.S. politicians and security analysts have agreed that nuclear terrorism poses the greatest threat to U.S. national security.[61] Wanting nuclear weapons and actually possessing them, however, are two different things and many analysts have pointed out the tremendous hurdles that terrorists would have to overcome in order to acquire nuclear weapons.[62] Nevertheless, as nuclear weapons spread, the possibility that they will eventually fall into terrorist hands increases. States could intentionally transfer nuclear weapons, or the fissile material required to build them, to terrorist groups. There are good reasons why a state might be reluctant to transfer nuclear weapons to terrorists, but, as nuclear weapons spread, the possibility that a leader might someday purposely arm a terrorist group with nuclear weapons increases. Some fear, for example, that Iran, with its close ties to Hamas and Hezbollah, might be at a heightened risk of transferring nuclear weapons to terrorists. Moreover, even if no state would ever intentionally transfer nuclear capabilities to terrorists, a new nuclear state, with underdeveloped security procedures, might be vulnerable to theft, allowing terrorist groups or corrupt or ideologically-motivated insiders to transfer dangerous material to terrorists. There is evidence, for example, that representatives from Pakistan’s atomic energy establishment met with Al Qaeda members to discuss a possible nuclear deal.[63] Finally, a nuclear-armed state could collapse, resulting in a breakdown of law and order and a loose nuclear weapons problem. U.S. officials are currently very concerned about what would happen with Pakistan’s nuclear weapons if the government were to fall. As nuclear weapons spread, this problem is only further amplified. Iran is a country with a history of revolutions and a government with a tenuous hold on power. The regime change that Washing has long dreamed about in Tehran could actually become a nightmare if Iran had nuclear weapons and a break down in authority forced us to worry about the fate of Iran’s nuclear arsenal.

#### Nuclear terror causes retal – global escalation

Robert Ayson, Professor of Strategic Studies and Director of the Centre for Strategic Studies: New Zealand at the Victoria University of Wellington, 2010, “After a Terrorist Nuclear Attack: Envisaging Catalytic Effects,” Studies in Conflict & Terrorism, Volume 33, Issue 7, July, Available Online to Subscribing Institutions via InformaWorld)

A terrorist nuclear attack, and even the use of nuclear weapons in response by the country attacked in the first place, would not necessarily represent the worst of the nuclear worlds imaginable. Indeed, there are reasons to wonder whether nuclear terrorism should ever be regarded as belonging in the category of truly existential threats. A contrast can be drawn here with the global catastrophe that would come from a massive nuclear exchange between two or more of the sovereign states that possess these weapons in significant numbers. Even the worst terrorism that the twenty-first century might bring would fade into insignificance alongside considerations of what a general nuclear war would have wrought in the Cold War period. And it must be admitted that as long as the major nuclear weapons states have hundreds and even thousands of nuclear weapons at their disposal, there is always the possibility of a truly awful nuclear exchange taking place precipitated entirely by state possessors themselves. But these two nuclear worlds—a non-state actor nuclear attack and a catastrophic interstate nuclear exchange—are not necessarily separable. It is just possible that some sort of terrorist attack, and especially an act of nuclear terrorism, could precipitate a chain of events leading to a massive exchange of nuclear weapons between two or more of the states that possess them. In this context, today’s and tomorrow’s terrorist groups might assume the place allotted during the early Cold War years to new state possessors of small nuclear arsenals who were seen as raising the risks of a catalytic nuclear war between the superpowers started by third parties. These risks were considered in the late 1950s and early 1960s as concerns grew about nuclear proliferation, the so-called n+1 problem. It may require a considerable amount of imagination to depict an especially plausible situation where an act of nuclear terrorism could lead to such a massive inter-state nuclear war. For example, in the event of a terrorist nuclear attack on the United States, it might well be wondered just how Russia and/or China could plausibly be brought into the picture, not least because they seem unlikely to be fingered as the most obvious state sponsors or encouragers of terrorist groups. They would seem far too responsible to be involved in supporting that sort of terrorist behavior that could just as easily threaten them as well. Some possibilities, however remote, do suggest themselves. For example, how might the United States react if it was thought or discovered that the fissile material used in the act of nuclear terrorism had come from Russian stocks,40 and if for some reason Moscow denied any responsibility for nuclear laxity? The correct attribution of that nuclear material to a particular country might not be a case of science fiction given the observation by Michael May et al. that while the debris resulting from a nuclear explosion would be “spread over a wide area in tiny fragments, its radioactivity makes it detectable, identifiable and collectable, and a wealth of information can be obtained from its analysis: the efficiency of the explosion, the materials used and, most important … some indication of where the nuclear material came from.”41 Alternatively, if the act of nuclear terrorism came as a complete surprise, and American officials refused to believe that a terrorist group was fully responsible (or responsible at all) suspicion would shift immediately to state possessors. Ruling out Western ally countries like the United Kingdom and France, and probably Israel and India as well, authorities in Washington would be left with a very short list consisting of North Korea, perhaps Iran if its program continues, and possibly Pakistan. But at what stage would Russia and China be definitely ruled out in this high stakes game of nuclear Cluedo? In particular, if the act of nuclear terrorism occurred against a backdrop of existing tension in Washington’s relations with Russia and/or China, and at a time when threats had already been traded between these major powers, would officials and political leaders not be tempted to assume the worst? Of course, the chances of this occurring would only seem to increase if the United States was already involved in some sort of limited armed conflict with Russia and/or China, or if they were confronting each other from a distance in a proxy war, as unlikely as these developments may seem at the present time. The reverse might well apply too: should a nuclear terrorist attack occur in Russia or China during a period of heightened tension or even limited conflict with the United States, could Moscow and Beijing resist the pressures that might rise domestically to consider the United States as a possible perpetrator or encourager of the attack? Washington’s early response to a terrorist nuclear attack on its own soil might also raise the possibility of an unwanted (and nuclear aided) confrontation with Russia and/or China. For example, in the noise and confusion during the immediate aftermath of the terrorist nuclear attack, the U.S. president might be expected to place the country’s armed forces, including its nuclear arsenal, on a higher stage of alert. In such a tense environment, when careful planning runs up against the friction of reality, it is just possible that Moscow and/or China might mistakenly read this as a sign of U.S. intentions to use force (and possibly nuclear force) against them. In that situation, the temptations to preempt such actions might grow, although it must be admitted that any preemption would probably still meet with a devastating response. As part of its initial response to the act of nuclear terrorism (as discussed earlier) Washington might decide to order a significant conventional (or nuclear) retaliatory or disarming attack against the leadership of the terrorist group and/or states seen to support that group. Depending on the identity and especially the location of these targets, Russia and/or China might interpret such action as being far too close for their comfort, and potentially as an infringement on their spheres of influence and even on their sovereignty. One far-fetched but perhaps not impossible scenario might stem from a judgment in Washington that some of the main aiders and abetters of the terrorist action resided somewhere such as Chechnya, perhaps in connection with what Allison claims is the “Chechen insurgents’ … long-standing interest in all things nuclear.”42 American pressure on that part of the world would almost certainly raise alarms in Moscow that might require a degree of advanced consultation from Washington that the latter found itself unable or unwilling to provide. There is also the question of how other nuclear-armed states respond to the act of nuclear terrorism on another member of that special club. It could reasonably be expected that following a nuclear terrorist attack on the United States, both Russia and China would extend immediate sympathy and support to Washington and would work alongside the United States in the Security Council. But there is just a chance, albeit a slim one, where the support of Russia and/or China is less automatic in some cases than in others. For example, what would happen if the United States wished to discuss its right to retaliate against groups based in their territory? If, for some reason, Washington found the responses of Russia and China deeply underwhelming, (neither “for us or against us”) might it also suspect that they secretly were in cahoots with the group, increasing (again perhaps ever so slightly) the chances of a major exchange. If the terrorist group had some connections to groups in Russia and China, or existed in areas of the world over which Russia and China held sway, and if Washington felt that Moscow or Beijing were placing a curiously modest level of pressure on them, what conclusions might it then draw about their culpability? If Washington decided to use, or decided to threaten the use of, nuclear weapons, the responses of Russia and China would be crucial to the chances of avoiding a more serious nuclear exchange. They might surmise, for example, that while the act of nuclear terrorism was especially heinous and demanded a strong response, the response simply had to remain below the nuclear threshold. It would be one thing for a non-state actor to have broken the nuclear use taboo, but an entirely different thing for a state actor, and indeed the leading state in the international system, to do so. If Russia and China felt sufficiently strongly about that prospect, there is then the question of what options would lie open to them to dissuade the United States from such action: and as has been seen over the last several decades, the central dissuader of the use of nuclear weapons by states has been the threat of nuclear retaliation. If some readers find this simply too fanciful, and perhaps even offensive to contemplate, it may be informative to reverse the tables. Russia, which possesses an arsenal of thousands of nuclear warheads and that has been one of the two most important trustees of the non-use taboo, is subjected to an attack of nuclear terrorism. In response, Moscow places its nuclear forces very visibly on a higher state of alert and declares that it is considering the use of nuclear retaliation against the group and any of its state supporters. How would Washington view such a possibility? Would it really be keen to support Russia’s use of nuclear weapons, including outside Russia’s traditional sphere of influence? And if not, which seems quite plausible, what options would Washington have to communicate that displeasure? If China had been the victim of the nuclear terrorism and seemed likely to retaliate in kind, would the United States and Russia be happy to sit back and let this occur? In the charged atmosphere immediately after a nuclear terrorist attack, how would the attacked country respond to pressure from other major nuclear powers not to respond in kind? The phrase “how dare they tell us what to do” immediately springs to mind. Some might even go so far as to interpret this concern as a tacit form of sympathy or support for the terrorists. This might not help the chances of nuclear restraint.

#### It causes the same causalities as full scale nuke war

O. B. Toon, et al. department of Atmospheric and Oceanic Sciences, U Colorado Boulder, 4-19-2007, “Atmospheric effects and societal consequences of regional scale nuclear conﬂicts and acts of individual nuclear terrorism,” Atmos. Chem. Phys., 7, 1973-2002.

To an increasing extent, people are congregating in the world’s great urban centers, creating megacities with populations exceeding 10 million individuals. At the same time, advanced technology has designed nuclear explosives of such small size they can be easily transported in a car, small plane or boat to the heart of a city. We demonstrate here that a single detonation in the 15 kiloton range can produce urban fatalities approaching one million in some cases, and casualties exceeding one million. Thousands of small weapons still exist in the arsenals of the U.S. and Russia, and there are at least six other countries with substantial nuclear weapons inventories. In all, thirty-three countries control sufﬁcient amounts of highly enriched uranium or plutonium to assemble nuclear explosives. A conﬂict between any of these countries involving 50-100 weapons with yields of 15 kt has the potential to create fatalities rivaling those of the Second World War. Moreover, even a single surface nuclear explosion, or an air burst in rainy conditions, in a city center is likely to cause the entire metropolitan area to be abandoned at least for decades owing to infrastructure damage and radioactive contamination. As the aftermath of hurricane Katrina in Louisiana suggests, the economic consequences of even a localized nuclear catastrophe would most likely have severe national and international economic consequences. Striking effects result even from relatively small nuclear attacks because low yield detonations are most effective against city centers where business and social activity as well as population are concentrated. Rogue nations and terrorists would be most likely to strike there. Accordingly, an organized attack on the U.S. by a small nuclear state, or terrorists supported by such a state, could generate casualties comparable to those once predicted for a full-scale nuclear “counterforce” exchange in a superpower conﬂict. Remarkably, the estimated quantities of smoke generated by attacks totaling about one megaton of nuclear explosives could lead to signiﬁcant global climate perturbations (Robock et al., 2007). While we did not extend our casualty and damage predictions to include potential medical, social or economic impacts following the initial explosions, such analyses have been performed in the past for large-scale nuclear war scenarios (Harwell and Hutchinson, 1985). Such a study should be carried out as well for the present scenarios and physical outcomes.

### Solvency

#### Loan guarantees spur massive capitalization but squo program is underfunded

Institute for 21st Century Energy, Mission of the U.S. Chamber of Commerce Institute for 21st Century Energy is to unify policymakers, regulators, business leaders, and the American public behind a common sense energy strategy to help keep America secure, prosperous, and clean, "Commit to and Expand Nuclear Energy Use", 2011 is copyright date, www.energyxxi.org/commit-and-expand-nuclear-energy-use

Nuclear power is currently an emissions-free source of 20% of America’s electricity supply, despite our not having licensed the construction of a nuclear power facility in nearly 30 years. Expansion of new nuclear power assets is essential to meet our projected growing demand while mitigating our emissions of CO2. As required by law, the federal government must provide authorized fiscal incentives for new nuclear power plants. We must solve our long-term nuclear waste challenges and aggressively expand efforts to recycle used nuclear fuel. Nuclear power is the nation’s largest emissions-free source of electricity. From a life-cycle perspective—including the impacts of uranium mining, uranium enrichment, fuel fabrication, plant construction, and fuel disposal—nuclear power offers a huge emissions advantage over any other large-scale method of baseload power generation and is on par with renewable sources. Nuclear power currently supplies about 20% of America’s electricity supply. America’s 104 operating nuclear power reactors are also the cheapest source of baseload electricityon a per-kilowatt-hour basis because operational and fuel costs are comparatively low. Although the existing nuclear units are successfully renewing their operating licenses for an additional 20 years, new nuclear power plants are essential to meet growing demand while avoiding GHG emissions. New nuclear power plants are capital-intensive, requiring an estimated $6–8 billion (2008 dollars) per plant. The U.S. electric power sector consists of many relatively small companies that do not have the size, financing capability, or financial strength to fund power projects of this scale on their own, in the numbers required. Outside financial support is necessary. The loan guarantee program authorized by EPAct2005 is a crucial tool to enable utilities to finance the construction of new reactors by increasing access to capital and enabling a higher share of leveraged debt. DOE estimates that by enabling a utility to rely more heavily on private debt than more expensive equity, a federal loan guarantee may save the ratepayers nearly 40% in the cost of power from a new nuclear plant. A well-managed loan guarantee program will be funded by project applicants and not require any expenditure of government funds. Unfortunately, the loan guarantee program has not been implemented effectively by the DOE, and the $18.5 billion in loan volume authorized by Congress for nuclear power projects is inadequate, given the estimated cost of a new nuclear power plant. That loan volume will support, at best, two, or three new projects. The current program should be expanded, and at the appropriate time merged with the Clean Energy Bank of the United States discussed earlier.

#### Government support overcomes financial barriers – key hurdle

Kassia Yanosek, entrepreneur-in-residence at Stanford University’s Steyer-Taylor Center for Energy Policy and Finance and a private equity investor in the energy sector as a principal at Quadrant Management and Founder of Tana Energy Capital LLC, Spring 2012, " Financing Nuclear Power in the US", energyclub.stanford.edu/index.php/Journal/Financing\_Nuclear\_Power\_by\_Kassia\_Yanosek

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

#### Operation costs are competitive – it’s just getting them built

Charles Ferguson, president of the Federation of American Scientists, November 2011, “JAPAN MELTED DOWN. BUT THAT DOESN'T MEAN THE END OF THE ATOMIC AGE,” Foreign Policy issue 189, EBSCO

IN FACT, NUCLEAR POWER plants are relatively cheap to operate. Averaging the costs over the life of the operation, a safely run plant can even be a cash cow, generating power at as low as 6 cents per kilowatt-hour, comparable to a coal-fired power plant. The problem is getting them built. A large reactor can cost several billion dollars, and construction delays -- as well as slowdowns forced by inevitable legal challenges -- have been known to drive up construction costs by $1 million a day. This problem is nothing new; it has plagued the industry since the 1970s. Years before the Three Mile Island disaster turned public opinion against the atom, the U.S. nuclear sector was already in trouble on account of legal and bureaucratic changes enacted under Presidents Richard Nixon, Gerald Ford, and Jimmy Carter that made new plants easier to stop with lawsuits -- usually filed by environmental and citizens' groups -- and regulations more unpredictable. That spooked investors, who in turn raised interest rates on borrowing for plant developers. The then-ongoing recession, which depressed energy demand, didn't help; neither did the plummeting price of oil and deregulation of natural gas that followed in the 1980s. Today, the industry argues that plant construction can only happen with the help of tens of billions of dollars in federal loan guarantees, which transfer financial risks onto taxpayers. But the fact is that nuclear power has never succeeded anywhere without enormous government backing. Until 2004, the French government wholly owned Électricité de France, the utility that operates all French nuclear power plants, and the government still controls more than 80 percent of it today. The Chinese government also largely or wholly owns China's nuclear-power utilities. And nuclear is hardly the only energy source that hasn't stood up in the free market once you factor in the external costs. Consider how much of the Pentagon's $550 billion-a-year budget goes toward securing oil supplies. For a country like Japan or South Korea, with virtually no domestic energy supplies, nuclear power may be worth the upfront costs if it allows for a measure of energy security. As for the rest of us, nuclear power may also come to seem a good deal, once you factor in the risks of climate change.

#### State incentives fail – capital costs too high

Ben Moshe, et al 2011 [Kelley Michael Gale is the Finance Department Chair of Latham & Watkins‘ San Diego office and serves as global Co-Chair for the firm‘s Climate Change and Cleantech Practice Groups. He has thirty years of experience representing private and public sector clients in the development, regulation, and financing of alternative energy projects and capital intensive infrastructure projects. The co-authors are attorneys in the Project Finance Practice Group in the San Diego office of Latham & Watkins LLP. The views expressed in this article are those of the authors and do not reflect the views of Latham & Watkins LLP or its clients. FINANCING THE NUCLEAR RENAISSANCE: THE BENEFITS AND POTENTIAL PITFALLS OF FEDERAL & STATE GOVERNMENT SUBSIDIES AND THE FUTURE OF NUCLEAR POWER IN CALIFORNIA Sony Ben-Moshe, Jason J. Crowell, Kelley M. Gale,\* Breton A. Peace, Brett P. Rosenblatt, and Kelly D. Thomason\*\*, p. google]

A primary reason why the financing of a nuclear power project may resemble a Mega-Financing is the sheer magnitude of capital required to finance project construction.32 Absent proper government incentives, the required capital may not be obtainable at optimal pricing for reasons aside from the intercreditor issues noted above. Lending institutions often have caps on the amount of capital that can be exposed to both a particular project and a specific industry sector. In addition, regulatory and construction risks at any given project will limit any particular investor‘s desire to put too much money into any one project. As a practical reality, this desire to diversify against risk and the sheer magnitude of debt capital needed for any project may limit the amount of debt a project sponsor can raise in the commercial bank and capital markets. Government issued loan guarantees present one way to potentially decrease perceived risk and thereby increase the amount of money an investor is willing to put into a project and bring to the table investors who might otherwise not be interested (for example, certain institutional investors may only invest in instruments backed by the full faith and credit of the United States Government). To optimize nuclear development in the United States, the specifics of the government support programs should be adjusted in ways necessary to reach the point whereupon lending institutions can invest sufficient capital for nuclear construction as part of a well-balanced portfolio of assets. Specific adjustments that may help reach this point are discussed in Section II.D.2 below. Nuclear power project financing also may more closely resemble a Mega- Financing than a traditional project financing of a renewable power project due to the unusual risks presented by construction of a nuclear reactor. One of the key issues involved in many Mega-Financings (particularly cross-border financings) is political risk and uncertainty. Natural gas liquefaction projects, for example, often take place in less developed countries in South America and West Africa, where political risk factors abound, including currency conversion risk, sovereign risk and environmental issues presented by investing in the global market. ―No matter how detailed a contract, a new political regime could change the rules and the conditions under which you made your investment virtually overnight.‖33 Similar to this political risk, investors in new domestic nuclear reactors will likely face substantial regulatory and permitting risks, such as the risk of litigation by residents or environmentalists desiring to thwart any large scale development of new reactors in the United States and the risk that a largely untested regulatory approval process may not operate as anticipated, and those challenges can result in significant delays in construction of a nuclear power project. Although they are different in kind, the substance of sovereign and other risks facing large overseas infrastructure projects is similar in the sense that worst case scenarios of delay or inability to make commercial use of the projects and the magnitude of the potential losses are roughly equivalent. As a risk mitigation measure in the case of financings for natural gas liquefaction facilities and other large overseas infrastructure projects, the Export-Import Bank of the United States may approve loan guarantees and offer credit enhancements and/or direct loans to support the sale of United States exports to emerging markets throughout the world. Its loan guarantees to support the construction of large overseas infrastructure projects increase the comfort of private institutional investors because these investors believe there is a substantially lower risk that an overseas political regime will change the rules in a manner adverse to creditors if the United States government is one of those creditors.34 In a similar fashion, regulatory risk insurance and loan guarantees provided by the federal government should encourage private financing of domestic nuclear power projects because the government providing the guarantees also controls many of the risk factors which could give rise to regulatory delays in commencing commercial operation of a new nuclear project. Further, in the nuclear power industry, the federal government is reviewing development applications and reactor designs, and is equipped with a team of experts in nuclear technologies, so that if the federal government has skin in the game, so to speak, private lenders may take additional comfort that the government has performed a certain level of due diligence on a particular project and determined that there are no major flaws from its vantage point. Section II.D.3 below discusses the risks covered by federally provided regulatory risk insurance and the ways in which it can be adapted to best encourage private sector financing for nuclear energy. Against the backdrop of this larger structuring discussion, as we look at different public support and incentive programs designed to spur development, we must bear in mind that the efficacy of these programs will depend on whether and how well they work in the context of larger, more complicated financing structures.35 In fact, the very complexity of intercreditor relationships in different deal structures may run counter to the government‘s adopted goal of standardizing and streamlining the development and financing of new nuclear projects.36 As a practical matter, not only must the credit support programs work in the context of these complex financings, but the government may also have to be involved in the structuring of these financings, taking a seat at the table to customize each transaction.

#### Free market hacks fail econ 101 – the market can’t solve externalities or early innovation – only government backing causes initial investment

Brad Plumer, reporter focusing on Energy and Environment issues at the Washington Post and analyst for Ezra Klein’s Wonkblog, 9-20-2011, “The pseudo-debate over Solyndra,” Washington Post, www.washingtonpost.com/blogs/wonkblog/post/the-pseudo-debate-over-solyndra/2011/09/20/gIQAyN2hiK\_blog.html

Since we can’t drill our way out of this bind, innovation is the best avenue left. Trouble is, private firms do a lukewarm job of funding new energy technologies. As a percentage of sales, the energy sector spends much, much less on R&D than the auto, pharmaceutical or computer industries. (Graph on the right courtesy of this report from the American Energy Innovation Council.) Why? For one, there’s no market incentive to tackle many externalities, such as the toll that carbon pollution exacts on the atmosphere. And many electric utilities remain heavily regulated and capital-intensive: A power plant can last 50 years or more, while a patent for a new technology lasts just 20. And so on. Energy wonks spend their days dreaming up policies to fix these problems, from slapping a price on carbon to deregulating the utility sector. But the simplest way to boost R&D is simply for the government to support innovation directly. Few people dispute the need to fund basic science research, given that companies under-invest in this stuff (it’s hard for one firm to capture all the gains from a broad breakthrough). That’s the logic behind programs such as ARPA-E, which is modeled after the Pentagon’s DARPA program and funds long-term, high-reward technologies like all-electron batteries. Supporters point to the government’s history of funding nifty innovations through programs such as NASA. They also note that the U.S. government spends far less on energy research than it does on defense and health R&D. So where do loan guarantees fit in? Once a lab has announced a breakthrough, can’t the private sector just run with the new idea? Not quite. As a recent report by the Center for American Progress’s Sean Pool discusses, energy technologies have to go through several stages to go from novel idea to actual marketable product. The development and demonstration stages are typically still too risky to attract most investors, and so rely on a smaller pool of angel investors and venture-capital funds. That still leaves a growing backlog of projects that either can’t secure funding or are just too daunting for investors to take on (say, a new multibillion-dollar nuclear reactor). Having the government step in will obviously entail some amount of risk. The Department of Energy wagers that 10 percent of its loans will eventually go bad (Solyndra made up about 1.3 percent of the program’s loan-guarantee portfolio). And plenty of critics have argued that the Energy Department itself is too clumsy and unwieldy to handle this financing — remember, this is a department whose main focus is overseeing our nuclear weapons stockpile. Back in 2009, the department was savaged for moving too slowly on energy loans. Now it’s getting flak for being too rash. Pool, for his part, suggests setting up some sort of independent clean-energy bank instead. In any case, that’s the rationale for having the government support risky technologies. Now if, say, Mitch McConnell was genuinely aghast about the government picking winners and losers, he could lead an effort to scrap all energy subsidies — including oil and gas tax breaks and loan guarantees for nuclear. But he’s not doing that. Nor are the critics of loan guarantees touting alternate policies to promote innovation (a carbon tax, say). Instead, there’s a lot of carping and an implicit defense of the status quo. Fair enough. Lots of people like the status quo, particularly fossil-fuel producers. But that’s a very different argument from the one Congress is pretending to have right now.

### DOE Thumper

#### DOE is funding SMRS

Ben Bradford, press secretary for a Member of Congress, 2-4-2013, “Are Mini-Reactors The Future Of Nuclear Power?” NPR, http://www.npr.org/2013/02/04/170482802/are-mini-reactors-the-future-of-nuclear-power

The U.S. government is investing millions of dollars in what it considers a promising new industry for American manufacturing: nuclear reactors. The plan is to build hundreds of mini-reactors, dot them around the U.S. and export them overseas. Development of these reactors are already in the works, and at one office park in Lynchburg, Va., where one of these reactors is being assembled, the traditional signs of nuclear reactors are nowhere to be found. There are no cooling towers that look like smoke stacks, no clouds of steam over the buildings — just a research building and a tower about nine stories tall. Inside, the plant's manager, Doug Lee, leads the way down through secure doors. It feels like the inside of a refrigerator but noisier. Spinning fans and water pumps drown out the sounds of hissing steam. At the reactor core, Lee stops. "I can't let you in here," Lee says. "But this is the base of the tower, and this is the lower portion of the large tower you saw when you came in. This is our simulated reactor vessel." It's simulated because the design still needs Nuclear Regulatory Commission approval. "This is analogous to the core in a nuclear plant where the fission reaction takes place," Lee says. The entire reactor — the core, the cooling system, everything — is self-contained in this rocket-shaped steel cylinder. The industry says that makes it safer. And the reactors will be small enough to build in a factory and ship on trucks, like prefabricated houses. They'll generate about one-tenth the power of a typical nuclear power plant. Assistant Energy Secretary Pete Lyons sees promise that goes beyond a new energy gadget. He sees jobs. "One of the features of these small reactors is that they can be entirely manufactured here in the United States," Lyons said. "They can literally be made in the USA. With the large plants, that's simply physically impossible." Lyons pictures churning reactors out in factories, shipping them to utilities to replace aging coal plants or selling them to developing countries — which can't afford a full-scale $15 billion nuclear plant. "We are trying to jump-start a new U.S. industry," he says. "That's my goal: a U.S. industry, U.S. jobs, clean energy." In November, the Energy Department invested in Babcock & Wilcox mPower, the nuclear company that built the prototype in Virginia. In total, the government plans to invest more than $400 million. Industry officials like B&W mPower President Chris Mowry say the launch funding is to get off the ground, but ultimately the reactors need to be mass-produced.

#### 1 million to high tech nuclear stuff

Patrick Mason, staff writer, 1-31-2013, “DOE grants $1 million for High-Temperature Gas-Cooled Reactor studies,” Examiner, http://www.examiner.com/article/doe-grants-1-million-for-high-temperature-gas-cooled-reactor-studies

Yesterday the Department of Energy (DOE) awarded the Next Generation Nuclear Plant (NGNP) Industry Alliance up to $1 million in cost sharing for research involving the High Temperature Gas Cooled Reactors (HTGR (Don't ask me what happened to the C, I don't know), to be done at the Idaho National Laboratories. But just what is a HTGR? It's one of the six futuristic designs picked to be researched to act as the next generation of nuclear reactor. The designs are currently being researched around the world by various different government and industry groups. Currently operating nuclear reactors use water as their coolant and boil that water (or secondary water in the case of PWRs) to make steam which is pushed through a turbine that spins a generator and allows you to turn your lights on. The HTGR's claim to fame is it's potential dual use ability, in that the gas used to cool the reactor could be used for things besides turning a turbine to make electricity. For instance the heated gas could be used as process heat in a variety of chemical processes, such as hydrogen production.

#### DOE funding for SMRs coming

Ken Silverstein, global energy business analyst, 1-15-2013, “After Fukushima, U.S. Seeks to Advance Small Nuclear Reactors,” Forbes, http://www.forbes.com/sites/kensilverstein/2013/01/15/after-fukushima-u-s-seeks-to-advance-small-nuclear-reactors/

Two years ago, some thought that the nuclear energy had been leveled. But the industry today is picking up steam by getting construction licenses to build four new units and by getting government funding to develop smaller nuclear reactors that are less expensive and which may be less problematic when it comes to winning regulatory approval. The creators of those roughly 100-megawatt electric modules want to sell their products first in this country before they would market them overseas to lesser-developed nations that don’t have a huge transmission infrastructure. They would be factory-built before being shipped and fueled to where the energy is needed. To the extent that more electric generation is required, no problem: Just lay the small-scale modules next to each other, making the financial outlays more manageable. “Restarting the nation’s nuclear industry and advancing small modular reactor technologies will help create new jobs and export opportunities for American workers and businesses, and ensure we continue to take an all-of-the-above approach to American energy production,” says Energy Secretary Steven Chu. To that end, the Obama administration is partnering with Babcock & Wilcox and Bechtel to develop those smaller nuclear reactors for the federally-owned utility Tennessee Valley Authority. The Department of Energy is expected to invest about $450 million in the project, which equates to roughly half of the overall cost. Industry will pony up the other half.

### AT: Ptx

#### Loan guarantees are popular – avoid budget concerns and special interest lobbying

Veronique de Rugy, a senior research fellow at the Mercatus Center at George Mason University, 6-19-2012, “Assessing the Department of Energy Loan Guarantee Program,” Mercatus Center, George Mason University, http://mercatus.org/publication/assessing-department-energy-loan-guarantee-program

Yet, these loan programs remain popular with Congress and the executive. That’s because in general most of the financial cost of these guaranteed loans will not surface for many years. That means that Congress can approve billions of dollars to benefit special interests, with little or no immediate impact to federal appropriations in the short term, because they are almost entirely off-budget.

### AT: Fees

#### Obama gives sweatheart deals – fees are low cost

Matthew Cardinale, staff writer, 6-30-2012, “U.S. Agency Gave Nuclear Industry a Sweet Deal, Documents Reveal,” IPS, http://www.ipsnews.net/2012/06/u-s-agency-gave-nuclear-industry-a-sweet-deal-documents-reveal/

The documents show the energy department (DOE) provided a sweetheart deal to Southern Company, the largest stakeholder in a consortium of utility companies that has been offered loan guarantees for two new nuclear reactors proposed for Plant Vogtle in Georgia. If the reactors come online in the coming years, they would be the first new reactors in the U.S. in decades. According to the documents, the DOE was going to charge Southern Company a credit subsidy fee of between half of one percent and 1.5 percent, well below the rates that DOE has charged other companies.

### LG Good

#### LG avoids picking winners and expands competition

Jesse Jenkins, Devon Swezey, and Alex Trembath, members of the breakthrough institute, transcript provided by Peter Sinclair, 11-2-2011, “Financing Clean Energy: Solyndra and DOE’s Loan Guarantee Program,” http://climatecrocks.com/2011/11/02/financing-clean-energy-solyndra-and-does-loan-guarantee-program/

Critics have seized on the news of Solyndra’s bankruptcy to condemn the Department of Energy’s Loan Guarantee Program, which provided a $535 million loan guarantee in 2009. TheNational Review’s Greg Pollowitz writes that Solyndra’s failure shows “why the government should not play venture capitalist.” Yet the fact is that, when judged by its entire diverse portfolio of investments, the LGP has performed remarkably well. Indeed, with a capitalization of just $4 billion, DOE has committed or closed $37.8 billion in loan guarantees for 36 innovative clean energy projects. The Solyndra case represents less than 2% of total loan commitments made by DOE, and will be easily covered by a capitalization of eight to ten times larger than any ultimate losses expected following the bankruptcy proceedings. The broad success story of the LGP shows why federal investment in clean energy is necessary to help early-stage clean energy technologies achieve scale and reach commercialization. The inherent uncertainty in investing in novel technologies, coupled with the high capital costs and long time horizons, prohibits most venture capital funds from investing in large-scale clean energy projects. Financing tools and direct investment from the federal government can help bridge this well-known “Commercialization Valley of Death,” and the LGP is an effective way of doing that. Instead of “picking winners and losers,” as the program’s critics allege, the program actually reduces risk for a suite of innovative clean energy technologies and allows venture capitalists and other private sector investors to invest in the best technology. Rather than picking winners, the LGP enables innovative companies to compete in the marketplace, allowing winners to emerge from competition. And while Solyndra is shutting its doors, companies like SunPower, First Solar, and Brightsource Energy, which also received loan guarantees and other support from the federal government, are industry leading success stories.