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## plan

#### The United States Federal Government should obtain, through Other Transactions authority, electricity from small modular reactors for its military installations in the United States.

## DOD

#### DoD bases are vulnerable to grid disruptions which destroys command infrastructure – only SMR’s can solve

Robitaille 12

(George, Department of Army Civilian, United States Army War College, “Small Modular Reactors: The Army’s Secure Source of Energy?” 21-03-2012, Strategy Research Project)

In recent years, the U.S Department of Defense (DoD) has identified a security issue at our installations related to the dependence on the civilian electrical grid. 1 The DoD depends on a steady source of electricity at military facilities to perform the functions that secure our nation. The flow of electricity into military facilities is controlled by a public grid system that is susceptible to being compromised because of the age of the infrastructure, damage from natural disasters and the potential for cyber attacks. Although most major functions at military installations employ diesel powered generators as temporary backup, the public grid may not be available to provide electricity when it is needed the most. The United States electrical infrastructure system is prone to failures and susceptible to terrorist attacks. 2 It is critical that the source of electricity for our installations is reliable and secure. In order to ensure that our military facilities possess a secure source of electricity, either the public system of electric generation and distribution is upgraded to increase its reliability as well as reducing its susceptibility to cyber attack or another source of electricity should be pursued. Although significant investments are being made to upgrade the electric grid, the current investment levels are not keeping up with the aging system. Small modular reactors (SMRs) are nuclear reactors that are about an order of magnitude smaller than traditional commercial reactor used in the United States. SMRs are capable of generating electricity and at the same time, they are not a significant contributor to global warming because of green house gas emissions. The DoD needs to look at small modular nuclear reactors (SMRs) to determine if they can provide a safe and secure source of electricity. Electrical Grid Susceptibility to Disruptions According to a recent report by the Defense Science Board, the DoD gets ninety nine percent of their electrical requirements from the civilian electric grid. 3 The electric grid, as it is currently configured and envisioned to operate for the foreseeable future, may not be reliable enough to ensure an uninterrupted flow of electricity for our critical military facilities given the influences of the aging infrastructure, its susceptibility to severe weather events, and the potential for cyber attacks. The DoD dependency on the grid is reflected in the $4.01 Billion spent on facilities energy in fiscal year 2010, the latest year which data was available. 4 The electricity used by military installations amounts to $3.76 billion. 5 As stated earlier, the DoD relies on the commercial grid to provide a secure source of energy to support the operations that ensure the security of our nation and it may not be available when we need it. The system could be taken down for extended periods of time by failure of aging components, acts of nature, or intentionally by cyber attacks. Aging Infrastructure. The U.S electric power grid is made up of independently owned power plants and transmission lines. The political and environmental resistance to building new electric generating power plants combined with the rise in consumption and aging infrastructure increases the potential for grid failure in the future. There are components in the U.S. electric grid that are over one hundred years old and some of the recent outages such as the 2006 New York blackout can be directly attributed to this out of date, aging infrastructure. 6 Many of the components of this system are at or exceeding their operational life and the general trend of the utility companies is to not replace power lines and other equipment until they fail. 7 The government led deregulation of the electric utility industry that started in the mid 1970s has contributed to a three decade long deterioration of the electric grid and an increased state of instability. Although significant investments are being made to upgrade the electric grid, the **many years of prior neglect will require a considerable amount of time and funding to bring the aging infrastructure up to date**. Furthermore, the current investment levels to upgrade the grid are not keeping up with the aging system. 8 In addition, upgrades to the digital infrastructure which were done to increase the systems efficiency and reliability, have actually made the system more susceptible to cyber attacks. 9 Because of the aging infrastructure and the impacts related to weather, the extent, as well as frequency of **failures is expected to increase in the future.** Adverse Weather. According to a 2008 grid reliability report by the Edison Electric Institute, sixty seven per cent of all power outages are related to weather. Specifically, lightning contributed six percent, while adverse weather provided thirty one percent and vegetation thirty percent (which was predominantly attributed to wind blowing vegetation into contact with utility lines) of the power outages. 10 In 1998 a falling tree limb damaged a transformer near the Bonneville Dam in Oregon, causing a cascade of related black-outs across eight western states. 11 In August of 2003 the lights went out in the biggest blackout in North America, plunging over fifty million people into darkness over eight states and two Canadian provinces. Most areas did not have power restored four or five days. In addition, drinking water had to be distributed by the National Guard when water pumping stations and/or purification processes failed. The estimated economic losses associated with this incident were about five billion dollars. Furthermore, this incident also affected the operations of twenty two nuclear plants in the United States and Canada. 12 In 2008, Hurricane Ike caused approximately seven and a half million customers to lose power in the United States from Texas to New York. 13 The electric grid suffered numerous power outages **every year** throughout the United States and the number of outages is expected to increase as the infrastructure ages without sufficient upgrades and weather-related impacts continue to become more frequent. Cyber Attacks. The civilian grid is made up of three unique electric networks which cover the East, West and Texas with approximately one hundred eighty seven thousand miles of power lines. There are several weaknesses in the electrical distribution infrastructure system that could compromise the flow of electricity to military facilities. The flow of energy in the network lines as well as the main distribution hubs has become totally dependent on computers and internet-based communications. Although the digital infrastructure makes the grid more efficient, it also makes it more susceptible to cyber attacks. Admiral Mr. Dennis C. Blair (ret.), the former Director of National Intelligence, testified before Congress that “the growing connectivity between information systems, the Internet, and other infrastructures creates opportunities for attackers to disrupt telecommunications, electrical power, energy pipelines, refineries, financial networks, and other critical infrastructures. 14 ” The Intelligence Community assesses that a number of nations already have the technical capability to conduct such attacks. 15 In the 2009 report, Annual Threat Assessment of the Intelligence Community for the Senate Armed Services Committee, Adm. Blair stated that “Threats to cyberspace pose one of the most serious economic and national security challenges of the 21st Century for the United States and our allies.”16 In addition, the report highlights a growing array of state and non-state actors that are targeting the U.S. critical infrastructure for the purpose of creating chaos that will subsequently produce detrimental effects on citizens, commerce, and government operations. These actors have the ability to compromise, steal, change, or completely destroy information through their detrimental activities on the internet. 17 In January 2008, US Central Intelligence Agency senior analyst Tom Donahue told a gathering of three hundred international security managers from electric, water, oil & gas, and other critical industry, that data was available from multiple regions outside the United States, which documents cyber intrusions into utilities. In at least one case (outside the U.S.), the disruption caused a power outage affecting multiple cities. Mr. Donahue did not specify who executed these attacks or why, but did state that all the intrusions were conducted via the Internet. 18 During the past twenty years, advances in computer technologies have permeated and advanced all aspects of our lives. Although the digital infrastructure is being increasingly merged with the power grid to make it more efficient and reliable, it also makes it more vulnerable to cyber attack. In October 2006, a foreign hacker invaded the Harrisburg, PA., water filtration system and planted malware. 19 In June 2008, the Hatch nuclear power plant in Georgia shut down for two days after an engineer loaded a software update for a business network that also rebooted the plant's power control system. In April 2009, The Wall Street Journal reported that cyber spies had infiltrated the U.S. electric grid and left behind software that could be used to disrupt the system. **The hackers came from China, Russia and other nations and were on a “fishing expedition” to map out the system**. 20 According to the secretary of Homeland Security, Janet Napolitano at an event on 28 October 2011, cyber–attacks have come close to compromising the country’s critical infrastructure on multiple occasions. 21 Furthermore, during FY11, the United States Computer Emergency Readiness Team took action on more than one hundred thousand incident reports by releasing more than five thousand actionable cyber security alerts and information products. 22 The interdependence of modern infrastructures and digital based systems makes any cyber attacks on the U.S. electric grid potentially significant. The December 2008 report by the Commission on Cyber Security for the forty fourth Presidency states the challenge plainly: “America’s failure to protect cyberspace is one of the most urgent national security problems facing the new administration”. 23 The susceptibility of the grid to being compromised has resulted in a significant amount of resources being allocated to ensuring the systems security. Although a substantial amount of resources are dedicated to protecting the nation’s infrastructure, it may not be enough to ensure the continuous flow of electricity to our critical military facilities. SMRs as they are currently envisioned may be able to provide a secure and independent alternative source of electricity in the event that the public grid is compromised. SMRs may also provide additional DoD benefit by supporting the recent government initiatives related to energy consumption and by circumventing the adverse ramifications associated with building coal or natural gas fired power plants on the environment.

#### Those communication breakdowns go nuclear

Andres and Breetz 11

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The DOD interest in small reactors derives largely from problems with base and logistics vulnerability. Over the last few years, the Services have begun to reexamine virtually every aspect of how they generate and use energy with an eye toward cutting costs, decreasing carbon emissions, and reducing energy-related vulnerabilities. These actions have resulted in programs that have significantly reduced DOD energy consumption and greenhouse gas emissions at domestic bases. Despite strong efforts, however, two critical security issues have thus far proven resistant to existing solutions: bases’ vulnerability to civilian power outages, and the need to transport large quantities of fuel via convoys through hostile territory to forward locations. Each of these is explored below. Grid Vulnerability. DOD is unable to provide its bases with electricity when the civilian electrical grid is offline for an extended period of time. Currently, domestic military installations receive 99 percent of their electricity from the civilian power grid. As explained in a recent study from the Defense Science Board: DOD’s key problem with electricity is that **critical missions, such as national strategic awareness and national command authorities, are** almost **entirely dependent on the national transmission grid** . . . [which] is fragile, vulnerable, near its capacity limit, and outside of DOD control. In most cases, neither the grid nor on-base backup power provides sufficient reliability to ensure continuity of critical national priority functions and oversight of strategic missions in the face of a long term (several months) outage.7 The grid’s fragility was demonstrated during the 2003 Northeast blackout in which 50 million people in the United States and Canada lost power, some for up to a week, when one Ohio utility failed to properly trim trees. The blackout created cascading disruptions in sewage systems, gas station pumping, cellular communications, border check systems, and so forth, and demonstrated the interdependence of modern infrastructural systems.8 More recently, awareness has been growing that the grid is also vulnerable to purposive attacks. A report sponsored by the Department of Homeland Security suggests that a coordinated cyberattack on the grid could result in a third of the country losing power for a period of weeks or months.9 Cyberattacks on critical infrastructure are not well understood. It is not clear, for instance, whether existing terrorist groups might be able to develop the capability to conduct this type of attack. It is likely, however, that some nation-states either have or are working on developing the ability to take down the U.S. grid. In the event of a war with one of these states, it is possible, if not likely, that parts of the civilian grid would cease to function, taking with them military bases located in affected regions. Government and private organizations are currently working to secure the grid against attacks; however, it is not clear that they will be successful. Most military bases currently have backup power that allows them to function for a period of hours or, at most, a few days on their own. If power were not restored after this amount of time, the results could be disastrous. First, military assets taken offline by the crisis would not be available to help with disaster relief. Second, **during an extended blackout, global military operations could be seriously compromised; this disruption would be particularly serious if the blackout was induced during major combat operations**. During the Cold War, this type of event was far less likely because the United States and Soviet Union shared the common understanding that **blinding an opponent with a grid blackout** **could escalate to nuclear war**. America’s current **opponents**, however, **may not share this fear or be deterred by this possibility**. In 2008, the Defense Science Board stressed that DOD should mitigate the electrical grid’s vulnerabilities by turning military installations into “**islands**” of energy self-sufficiency. The department has made efforts to do so by promoting efficiency programs that lower power consumption on bases and by constructing renewable power generation facilities on selected bases. **Unfortunately, these programs will not come close to reaching the goal of islanding the vast majority of bases**. Even with massive investment in efficiency and renewables, most bases would not be able to function for more than a few days after the civilian grid went offline Unlike other alternative sources of energy, **small reactors have the potential to solve DOD’s vulnerability to grid outages**. Most bases have relatively light power demands when compared to civilian towns or cities. Small reactors could easily support bases’ power demands separate from the civilian grid during crises. In some cases, the reactors could be designed to produce enough power not only to supply the base, but also to provide critical services in surrounding towns during long-term outages. Strategically, islanding bases with small reactors has another benefit. One of the main reasons an enemy might be willing to risk reprisals by taking down the U.S. grid during a period of military hostilities would be to affect ongoing military operations. Without the lifeline of intelligence, communication, and logistics provided by U.S. domestic bases, American military operations would be compromised in almost any conceivable contingency. Making bases more resilient to civilian power outages would reduce the incentive for an opponent to attack the grid. An opponent might still attempt to take down the grid for the sake of disrupting civilian systems, but the powerful incentive to do so in order to win an ongoing battle or war would be greatly reduced.

#### DoD bypasses regulatory hurdles and safety hazards

Loudermilk 11

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

Path forward: Department of Defense as first-mover Problematically, despite the immense energy security benefits that would accompany the wide-scale adoption of small modular reactors in the US, with a difficult regulatory environment, anti-nuclear lobbying groups, skeptical public opinion, and of course the recent Fukushima accident, the nuclear industry faces a tough road in the battle for new reactors. While President Obama and Energy Secretary Chu have demonstrated support for nuclear advancement on the SMR front, progress will prove difficult. However, a potential route exists by which small reactors may more easily become a reality: the US military. The US Navy has successfully managed, without accident, over 500 small reactors on-board its ships and submarines throughout 50 years of nuclear operations. At the same time, serious concern exists, highlighted by the Defense Science Board Task Force in 2008, that US military bases are tied to, and almost entirely dependent upon, the fragile civilian electrical grid for 99% of its electricity consumption. To protect military bases’ power supplies and the nation’s military assets housed on these domestic installations, the Board recommended a strategy of “islanding” the energy supplies for military installations, thus ensuring their security and availability in a crisis or conflict that disrupts the nation’s grid or energy supplies. DOD has sought to achieve this through decreased energy consumption and renewable technologies placed on bases, but these endeavors will not go nearly far enough in achieving the department’s objectives. However, by placing small reactors on domestic US military bases, DOD could solve its own energy security quandary—providing assured supplies of secure and constant energy both to bases and possibly the surrounding civilian areas as well. Concerns over reactor safety and security are alleviated by the security already present on installations and the military’s long history of successfully operating nuclear reactors without incident. Unlike reactors on-board ships, small reactors housed on domestic bases would undoubtedly be subject to Nuclear Regulatory Commission (NRC) regulation and certification, however, with strong military backing, adoption of the reactors may prove significantly easier than would otherwise be possible. Additionally, as the reactors become integrated on military facilities, general fears over the use and expansion of nuclear power will ease, creating inroads for widespread adoption of the technology at the private utility level. Finally, and perhaps most importantly, action by DOD as a “first mover” on small reactor technology will preserve America’s badly struggling and nearly extinct nuclear energy industry. The US possesses a wealth of knowledge and technological expertise on SMRs and has an opportunity to take a leading role in its adoption worldwide. With the domestic nuclear industry largely dormant for three decades, the US is at risk of losing its position as the global leader in the international nuclear energy market. If the current trend continues, the US will reach a point in the future where it is forced to import nuclear technologies from other countries—a point echoed by Secretary Chu in his push for nuclear power expansion. Action by the military to install reactors on domestic bases will guarantee the short-term survival of the US nuclear industry and will work to solidify long-term support for nuclear energy. Conclusions In the end, small modular reactors present a viable path forward for both the expansion of nuclear power in the US and also for enhanced US energy security. Offering highly safe, secure, and proliferation-resistant designs, SMRs have the potential to bring carbon-free baseload distributed power across the United States. Small reactors measure up with, and even exceed, large nuclear reactors on questions of safety and possibly on the financial (cost) front as well. SMRs carry many of the benefits of both large-scale nuclear energy generation and renewable energy technologies. At the same time, they can reduce US dependence on fossil fuels for electricity production—moving the US ahead on carbon dioxide and GHG reduction goals and setting a global example. While domestic hurdles within the nuclear regulatory environment domestically have proven nearly impossible to overcome since Three Mile Island, military adoption of small reactors on its bases would provide energy security for the nation’s military forces and may create the inroads necessary to advance the technology broadly and eventually lead to their wide-scale adoption.

#### SMR’s “island” bases by providing constant reliable power

King 11

Marcus King, Ph.D., Center for Naval Analyses Project Director and Research Analyst for the Environment and Energy TeamLaVar Huntzinger, Thoi Nguyen, March 2011, Feasibility of Nuclear Power on U.S.Military Installations, www.cna.org/sites/default/files/research/Nuclear Power on Military Installations D0023932 A5.pdf

Having a reliable source of electricity is critically important for many DoD installations. Fort Meade, Maryland, which hosts the National Security Agency’s power intensive computers, is an example of where electricity is mission critical. Installations need to be more robust against interruptions caused by natural forces or intentional attack. Most installations currently rely on the commercial electricity grid and backup generators. Reliance on generators presents some limitations. A building dedicated generator only provides electricity to a specific building when there is a power outage. Typically, diesel standby generators have an availability of 85 percent when operated for more than 24 hours [38]. Most DoD installations keep less than a 5-day supply of fuel. Small nuclear power plants could contribute to electrical energy surety and survivability. Having nuclear power plants networked with the grid and other backup generating systems 5 could give DoD installations higher power availability during extended utility power outages and more days of utility-independent operation. Existing large commercial nuclear power plants have an availability of over 90 percent. When a small nuclear power plant is networked with existing backup generating systems and the grid, overall availability values could be as high as 99.6 percent [39]. Since proposed small reactors have long refueling intervals (from 4 to 30 years), if power from the commercial grid became unavailable, a small reactor could provide years of electrical power independent of the commercial grid [4]. Power assurance to DoD installations also involves three infrastructure aspects of electricity delivery: electrical power transmission, electricity distribution, and electricity control (of distribution and transmission). Electric power transmission is the bulk transfer of electrical energy from generating plants to substations located near population centers. Electricity distribution networks carry electricity from the substations to consumers. Electricity control is the management of switches and connections to control the flow of electricity through transmission and distribution networks. Typically, transmission lines transfer electricity at high voltages over long distances to minimize loss; electricity distribution systems carry medium voltages. For electrical power transmission, very little additional infrastructure is required to incorporate small nuclear power plants because they would be located on or near the DoD installation being serviced. However, redundancy in transmission lines would make the overall network more robust. Electricity control capabilities, such as self-healing 6 and optimization of assets to increase operational efficiency, could improve overall power availability; however, they are not necessary for the integration of small nuclear power plants. Key components for improving electricity control include advanced electricity meters and electricity meter data management. These tools are needed in order to establish islanding, a condition in which a portion of the utility system, which contains both load and generation, is isolated from the remainder of the utility system and continues to operate. Since the power generation capacities of small nuclear power plants are larger than required for most DoD bases, islanding could extend to adjacent communities if sufficient technical upgrades were performed to systems outside of the installation. This contributes to DoD missions because civilians and service members working on the installation often live with their families in adjacent communities. The power would ensure that critical services such as emergency response, waste water treatment, and hospitals could be maintained.

#### Guantanamo is uniquely vulnerable

Steve Packard 11, member of the James Randi educational foundation – contributor to the Bad Science Blog, “20 Classic Atomic Energy Ads”, http://depletedcranium.com/20-classic-atomic-energy-ads/

I do think that these small reactors have enormous potential. They can be set up quickly and need relatively little maintenance and labor to keep running for extended periods of time. They can be prefabricated and theoretically mass produced.

There are certainly plenty of places that sorely need a reliable, relatively small, economical source of power: The Marshall Islands, Bermuda, Aruba, Barbados, Thull Air Force Base, the remote mining and oil and gas operations in Alaska and northern Canada, South Pole Station, McMurdo Base, the Canary Islands, Guantanamo Bay Naval Station, Fiji, various parts of Africa.

#### Plan solves base vulnerability – Gitmo’s modeled by the military

Annie Snider 11, reporter for Greenwire writing in the New York Times, “Could Alternative Energy Be Gitmo's Next Legacy?”, June 13, <https://www.nytimes.com/gwire/2011/06/13/13greenwire-could-alternative-energy-be-gitmos-next-legacy-85177.html?pagewanted=all#h[EteIah,2>]

As the Pentagon looks for ways to build a military that runs on less but remains every bit as lethal, Guantanamo Bay Naval Station is gaining a reputation as an ideal test bed. It is a reputation decades in the making and spurred by necessity. Ever since 1964, when Cuban leader Fidel Castro cut off the U.S. base from the country's electric grid and water system amid sparking Cold War tensions, the naval station has had to quench its own substantial thirst for power and water. The high cost of shipping in fuel for inefficient generators that run the base's power grid and desalinization plant had the base's public works staff looking to cut consumption and bring new sources of power online long before defense chiefs were giving the topics the spotlight. Eleven years ago, for instance, staff began drawing up plans for wind turbines that now sit on the base's highest ridge. But there are as many lessons for the military in the bumps Gitmo's staff has hit in its quest for energy security as there are in its successes. When plans for those wind turbines were drawn up in 2001, the base projected that they would provide a quarter of the base's energy and provide major savings by cutting the amount of fuel being shipped in. But that was before the terrorist attacks of Sept. 11, 2001, before the U.S. undertook two wars, and before detention centers were set up on the east side of the base to house those wars' prisoners. By the time the wind farm was finished in 2005, the base was home to more than twice as many personnel and supported a whole new, energy-intensive operation. Today, four 950-kilowatt wind turbines tower over the base's Cold War-era bunkers, but they account for about 2 to 3 percent of the base's overall power generation. And although the turbines are operating as expected, the naval station is actually shipping in more fuel, not less. The story of Guantanamo Bay's wind power speaks to the particular challenges the military faces as it aims to become less reliant on fuel: Missions change quickly, and energy is rarely an important factor when deciding how to tackle them. With energy security now commanding attention at the highest levels of the defense world, the pressure is on Pentagon officials to find solutions that will work for U.S. forces. For them, Guantanamo Bay Naval Station has become a case study in the benefits -- and the challenges -- of trying to reduce energy and water use and switch to alternative sources. Cost of self-sufficiency When Castro cut off Guantanamo in 1964, the Navy spent five months importing potable water by barge while a desalination plant was built at break-neck speed. It was such an astonishing feat that Castro did not believe it could be true. He accused the United States of stealing Cuban water. To prove him wrong, the base's commanding officer, Vice Adm. John Bulkeley, invited reporters to join him at the base's northeast gate, where he cut the pipe connecting the base to the Cuban water system. He held up the pipe, and it was bone dry. Today, the 45-square-mile naval station in southeast Cuba -- the United States' oldest overseas base and the only one located in a country with which the United States has no diplomatic relations -- produces about 1 million gallons of water each day and generates enough power to meet a summertime peak demand of some 22 megawatts. In April, the Navy's top environment and energy official, Assistant Secretary of the Navy Jackalyne Pfannenstiel, visited the base to get a first-hand look at the base's unique energy strategy. "The Navy recognizes that we have a national need to wean ourselves from imported oil products," Pfannenstiel said after touring the base's utilities. "[Guantanamo] could be a model for what can be done." The energy to run Guantanamo Bay Naval Station's desalinization plant and power the military operations, including the nine prisons, comes primarily from a network of 19 diesel generators that run on fuel barged to the island. They consume between 25,000 and 30,000 gallons of fuel each day. It is an extremely expensive arrangement. DOD pays on the order of $80,000 a day for fuel and lube oil, according to Tim Wagoner, the base's resource efficiencies manager. "I used to work at Fort Campbell," Wagoner said, referring to the U.S. Army base in Kentucky. "They consume about twice as much power as we do here, but their bill is about a third of what ours is." If DOD were not footing the costs, the monthly power bill for a two-bedroom house on base would run about $550, according to Navy calculations. But the cost isn't the worst of it. The base's commanding officer said Guantanamo Bay's energy situation also makes it vulnerable to accidents or attacks. "Energy and water -- that's kind of my Achilles' heel here," said Capt. Kirk Hibbert, who took command of the naval station last September. "We certainly cannot go across town and say, 'Hey, can I borrow some of your power?'" No simple calculation The Pentagon spends about $16 billion a year on fuel, and when oil prices spike, they hit DOD's budget to the tune of $130 million a year for every $1 increase per barrel. But alternative energy projects are not always financial no brainers for DOD. While transporting energy can be extremely expensive and at times dangerous, so too can shipping the materials, equipment and people that it takes to build new renewable energy infrastructure. At Guantanamo Bay, the rule of thumb is that everything costs about one-and-a-half times what it costs in the United States since it has to be flown or shipped in to the base. That can make it tough to justify investing in something new when the old one still works. The base has a number of landmarks from its 108-year history, testifying to how slowly things change here. The base's original desalinization plant still stands, rusting but intact, because tearing it down and shipping it off base is prohibitively expensive. Poorly insulated buildings, some dating back to the 1950s or earlier, remain in use today with air conditioners whirring against the piercing tropical sun. The tug of war between long-term and short-term costs, combined with the constant need for backup options, is especially stark at the base's power plant. The base recently got two new, high-efficiency diesel generators, joining the two it had previously received as part of the same Energy Savings Performance Contract that brought the wind turbines in 2005. But when the four were off-line for maintenance on a day with temperatures of nearly 90 degrees Fahrenheit in late April, the base was running on seven 1970s-era generators that had been pulled from a salvage yard in Norfolk, Va., as well as three "old workhorses" as the staff calls them, that were built in 1957. The high-performance generators, which are about 25 percent more efficient, make economic sense, Pfannensteil said, and the base staff are hoping to get a few more. But they are not giving the old ones up yet. Other renewable energy projects have won funds by piggybacking on existing construction projects. For instance, there is a new gym in the works that will include a concentrated solar array that is expected to produce 440,000 kilowatt-hours in a year. "We've got a top-down strategy for renewables for the base with 15 sites identified for different renewable projects," Wagoner said. "At the same time, if we get a big project like our gym renovation project ... then we have the opportunity to say, 'Hey, we can add this much solar power to the building to get it closer to a net-zero building, can we move forward with that?' We've had a lot of success moving things forward that way." Meanwhile, Pentagon purse-holders are beginning to choose renewable energy investments based on more than just financial payback, with items like energy security ranking high. The military recently implemented "a new investment decision-making tool called Energy Return on investment (eROI)," Pfannenstiel said in an email. The tool considers a project's financial and nonfinancial benefits, she wrote, including "energy security capabilities, legislative mandate compliance, political/public affairs enhancements, and linkage to other long-term goals." A central DOD program also recently revised its calculations, considering the ability of a project to produce "game-changing" improvements in energy consumption, costs and security when deciding where to invest its $135 million budget. Alt-energy proving ground With a high cost of conventional fuel and a bounty of sun and wind, DOD officials say Guantanamo Bay makes an ideal laboratory for testing alternative energy and energy efficiency technologies. The base also has a unique amount of autonomy when it comes to trying something new. "The thing about Guantanamo Bay is, you don't have to go through a lot of the bureaucratic red tape -- with corps meetings, with local governments -- that folks may have to do back in the states," said Commanding Officer Hibbert. "Here, you may be able to bring things down here and test and validate here, so we can provide those results back to the states." Turning DOD's 300,000 or so buildings and 2.2 billion square feet of space into an energy test bed is an idea that has both DOD officials and energy technology businesses excited. In 2009, the Pentagon launched a $20 million pilot project and this year is looking to institutionalize it with a $30 million research and development budget. This program makes good, plain sense, the DOD official in charge of the military's bases told Congress earlier this year. "Emerging technologies offer a way to cost effectively reduce DOD's facility energy demand by a dramatic amount ... and provide distributed generation to improve energy security," said Deputy Undersecretary of Defense for Installations and Environment Dorothy Robyn in written testimony. "Absent outside validation, however, these new technologies will not be widely deployed in time for us to meet our energy requirements." Energy technology entrepreneurs like the idea because it gives them an early adopter to prove the technology. It also helps them clear the military's particular hurdles for approval and opens them up to DOD's vast market (Greenwire, March 31).

#### Gitmo’s key to Caribbean stability and counter-narcotics

Frida Berrigan 8, research associate at the World Policy Institute, specializing in arms trade, “Guantanamo: The Bigger Picture”, March 17, <http://www.fpif.org/articles/guantanamo_the_bigger_picture>

Navy Commander Jeffery D. Gordon explains that the U.S. presence at Guantanamo serves "a vital role in Caribbean regional security, protection from narco-trafficking and terrorism and safeguards against mass migration attempts in unseaworthy craft." The Navy’s Atlantic fleet is based there and the base is described as being "on the front lines of the battle for regional security."

#### That’s key to solve regional instability and nuclear smuggling

Ambassador (Ret.) Curtis A. Ward 11, Adjunct Professor in the Elliott School of International Affairs at The George Washington University, “Regional Threats: Security Capacity Imperatives in the Caribbean” ndupress, issue 58, 3d quarter 2010, http://www.ndu.edu/press/regional-threats.html

More than 6 years after this declaration, the problems of security in the Caribbean have increased considerably, and the threats have become more complex and therefore require far more superior responses. Caribbean states remain "vulnerable and susceptible" to the same risks identified at the 2004 Americas Summit in Monterrey, Mexico. They still lack "technical and financial resources," and the risks associated with the region still exist despite significant efforts by a number of Caribbean countries to improve security infrastructure and security expertise. However, with limited resources and insufficient technical and financial support from the United States and other international partners, such as Canada and the European Union, the security situation in the Caribbean should continue to be a cause of great concern to the United States in the same way it was 6 years ago in Monterrey. The expectations that followed the Monterrey pronouncement have not been met. Except for its support for drug interdiction in the Caribbean, the United States has not kept pace with the security and development imperatives of the region. During this period, there has been little U.S. assistance to prevent the trafficking in illegal arms (automatic weapons and other small arms) to the Caribbean. By failing to staunch its own flow of guns, the United States itself has not matched the level of cooperation it has demanded of Caribbean countries in dealing with illegal drug trafficking through and from the region to the United States. Furthermore, most of the security imperatives imposed on the region are direct results of bilateral pressure from the U.S. Government, including through requirements of legislation such as the Maritime Transportation Security Act to protect the homeland, the international supply chain, and particularly U.S. trade.4 Added to U.S.-imposed requirements are new security standards and best practices developed in international forums to deal with the threat of international terrorism and maritime and aviation security, often at the urging and leadership of the United States in the post-9/11 era. The Security-Development Nexus While Caribbean states remain relatively safe destinations for American visitors, there are significant security problems that threaten the future political stability and fragile economies of these states. Highlighting these problems is not intended to create any form of hysteria or to raise the threat level on Caribbean travel but to ensure that negative trends in the region are arrested before the problems become uncontrollable and irreversible. Preventative action, now rather than later, serves both the national security interests of the United States and the security and economic development interests of the region. Caribbean security problems are not insurmountable, but they are beyond the technical and financial resource capacities of Caribbean countries to fix. Without significant input from the United States and other partner countries, the problems will only get worse and will pose significant threats to the U.S. homeland and the region in the future. The countries of the English-speaking Caribbean, despite their fragile economies, begin with clear advantages over most countries in other regions and subregions, including Central and South America. The Englishspeaking Caribbean countries have strong democratic underpinnings, adhere to the rule of law, and have in place well-defined, though significantly underresourced, institutional mechanisms.5 These distinctions provide a platform for institutional and operational capacity-building and security enhancement. The security problems, while varied from country to country, have some common threads. These include substantial gaps in border management and control capacities— in particular, customs administration and control, port facilities security, and maritime border control. There is significant lack of capacity to prevent contraband from entering the international supply chain and the domestic environment. This capacity gap considerably increases the threat of weapons of mass destruction (WMD) and their precursors entering the international supply chain from or transiting marginally secured port facilities destined for the United States. The wide gaps in the capacities of the island states to patrol and secure their territorial sea and coastlines increase the likelihood of terrorists and international criminals gaining access to U.S. commercial shipping and cruise ship assets.

#### Instability causes global war–also collapses trade

Ivelaw L. Griffith 2k, professor of political science and dean of the honors college at Florida International University, “U.S. Strategic Interests in Caribbean Security”, JFQ: Joint Force Quarterly, Autumn 2000, Issue 26

The strategic importance of the Caribbean is found in its resources, sea lanes, and security networks. The Caribbean Basin is the source of fuel and nonfuel minerals used in both the defense and civilian sectors. Of particular significance are petroleum and natural gas produced in Barbados, Colombia, Guatemala, Trinidad and Tobago, and Venezuela. Moreover, though several countries and U.S. territories in the area do not have energy resources, they offer invaluable refining and transshipment functions (Aruba, Bahamas, Curacao, Dominican Republic, Jamaica, Puerto Rico, St. Lucia, and U.S. Virgin Islands). Other mineral resources from the Caribbean include bauxite, gold, nickel, copper, cobalt, emeralds, and diamonds. The Caribbean Basin has two of the world's major choke points, the Panama Canal and the Caribbean Sea. The former links the Atlantic and Pacific Oceans and saves 8,000 miles and up to 30 days of steaming time. The canal has military and civilian value. And while it is less important to the United States than it was two decades ago, other countries remain very dependent on it, and many, like Chile, Ecuador, and Japan, are militarily or politically important to Washington. Once ships enter the Atlantic from the canal they must transit Caribbean passages en route to ports of call in the United States, Europe, and Africa. The Florida Strait, Mona Passage, Windward Passage, and Yucatan Channel are the principal lanes. The Caribbean is also our southern flank. Until a decade ago the United States maintained a considerable military presence throughout the Caribbean, mainly in Puerto Rico at the Atlantic threshold, in Panama at the southern rim, and in Cuba at Guantanamo on the northern perimeter. In 1990, for instance, there were 4,743 military and civilian personnel in Puerto Rico, 20,709 in Panama, and 3,401 in Cuba. Much has changed since 1990, requiting strategic redesign and force redeployment. Today Puerto Rico is home to fewer forces, and U.S. Southern Command (SOUTHCOM) relocated from Panama to Miami in September 1997, leaving behind only small components. Guantanamo, long considered to have little strategic value, serves essentially as a political outpost in the last remaining communist bastion in the hemisphere, with about 1,200 military and civilian personnel. During the 1980s the Soviet presence in Cuba included modern docks and repair facilities, reconnaissance aircraft, and satellite and surveillance capabilities. The 28-square mile base located at Lourdres monitored missile tests, intercepted satellite communications, and relayed microwave communications to diplomatic posts in the Western Hemisphere. The facility was reputedly the largest maintained by the Soviet Union abroad. It is still in operation, but not at Cold War levels. Yet fear of foreign encroachment persists. The United States is concerned about increasing Chinese interest and investment in Panama. Although such strategic affairs may not be crucial to Washington, they affect allies as well as regional stability and security and thus bear watching. Geoeconomics The mixture of geography, economics, and national power in the area exercises influence over trade and investment. For example, the Department of Commerce found that for the four-year period prior to 1988 a total of 646 U.S. companies invested over $1.5 billion in Caribbean Basin Initiative (CBI) beneficiary countries. Moreover, from 1986 to 1995 U.S. trade surpluses with the area grew from $297 million to $2.6 billion. In 1995 exports grew by 15 percent, to $8 billion, with the Dominican Republic and Jamaica accounting for 55 percent. That year also saw surpluses with every country except Aruba, Dominican Republic, and Trinidad and Tobago. Last year the U.S. Trade Representative told an InterAmerican Development Bank forum, "Taken as a whole, the Caribbean Basin is a larger market for our goods than ... France, Brazil, or China. Likewise, the United States is the area's natural market, taking 80 percent of its exports and providing nearly $50 billion in foreign direct investment." The United States is the largest trading partner and source of capital flows for Caribbean Community and Common Market countries. CBI nations are a principal market for U.S. exports, totaling $21.1 billion in 1998 (9.1 percent over the previous year). Exports to the Caribbean Basin accounted for 3 percent in 1998 (up 2.8 percent over the previous year). An estimated half of each dollar spent in the area is returned to the United States compared with 10 cents from Asia. Further, this trade supports some 400,000 jobs in this country and many more in the Caribbean. Moreover, the Overseas Private Investment Corporation (OPIC) reported in 2000 that from 1995 to 1999 it assisted in 38 projects in the area involving $3.2 billion in investments, which are expected to generate $1.5 billion in U.S. exports and, in turn, support 4,500 jobs in this country. Moreover, in February 1999, OPIC and Citibank established a $200 million investment facility for Central America and the Caribbean to help meet needs for medium- and long-term capital. Geonarcotics There are four dimensions in the drug phenomenon: production, consumption, trafficking, and money laundering. These activities threaten the security of states around the world. Narcotics operations and capital ventures which they spawn precipitate both conflict and cooperation among state and nonstate actors in the international system. Because of the global dispersion of drug traffic and physical, social, and political features of facilitating countries, power involves securing compliant action. In the drug world, this power is both state and nonstate in origin, and some nonstate sources exercise relatively more power than state entities. Politics revolves around resource allocation through the ability of power brokers to determine who gets what, when, where, and how. Because power in this milieu is not only state in origin, resource allocation is not exclusively a state function. Drug operations generate complex relationships. Some involve nonmilitary pressures such as political and economic sanctions by the United States against countries it considers not proactive enough in combating drug traffic. Yet the problem entails more than the movement of drugs from and through the area; it involves money laundering, organized crime, corruption, arms dealing, and matters of sovereignty. Such activities are reported in the International Narcotics Control Strategy Report issued annually by the Department of State and are reflected in the following vignettes: Operation Dinero, an international money laundering sting conducted out of tiny Anguilla from January 1992 to December 1994, led to the seizure of nine tons of cocaine and $90 million in assets, including expensive paintings, Head of a Beggar by Pablo Picasso among them. Cocaine seizures in only five nations--Bahamas, Belize, the Dominican Republic, Haiti, and Jamaica--totaled 3,300 kilos in 1993. Seizures for those same countries amounted to 6,230 kilos--almost double--during 1999. Between 1993 and 1998, over 9,000 deportees were returned to Jamaica, most for drug-related offenses in Canada, the United Kingdom, and the United States. In November 1998, American owned Cupid Foundations closed its business in Jamaica after 22 years with a loss of 550 jobs. Cupid could no longer afford the fines incurred with the seizure of its merchandise by U.S. Customs because of attempts to smuggle drugs in its clothing. Operation Conquistador, conducted March 10-26, 2000, involving the United States and 24 nations in the region, led to the issuance of 7,300 search warrants, arrest of 2,300 people, and seizure of 12,000 pounds of cocaine, 120 pounds of heroin, 150 pounds of hashish oil, 30 pounds of morphine base, 172 vehicles, 13 boats, and 83 guns. Between November 24, 1999, and June 6, 2000, 12 freighters were seized in Miami on arrival from Haiti with over 6,000 pounds of cocaine hidden in their cargo. Since mid-October 2000 Jamaica has produced a drug-related drama involving high-level police corruption, illegal wire-tapping of government officials, and the attempted assassination of the head of the National Firearms and Drug Intelligence Center. Traditional and Emerging Issues Security in the Caribbean has political, military, economic, and environmental implications and includes internal and external threats. Nonstate actors are as important as state actors. Indeed, many nonstate actors can mobilize more economic and military assets than some countries. Thus the security landscape reveals both traditional and nontraditional concerns. Territorial disputes and geopolitical posturing are core traditional issues. Belize, Colombia, Guatemala, Guyana, Suriname, and Venezuela have serious disagreements, some of which Involve multiple disputes. For example, Guyana faces claims by Venezuela for the western five-eighths of its 214,970 square kilometers of territory and by Suriname for 15,000 to the east. Drugs, political instability, migration, and the environment are major nontraditional issues. There is no uniformity in the importance ascribed to them, but a comparison of the traditional and nontraditional categories reveals a generally higher premium on nontraditional issues. Some states, such as those in the Eastern Caribbean, face no traditional security concerns or overt threats. The foremost nontraditional threat involves drugs. This multifaceted problem has increased in scope and gravity over the last decade and a half and added security effects. Crime, corruption, and arms dealing dramatically impact on national security and governance in political, military, and economic terms. They also infringe on national sovereignty. Two decades ago most Caribbean leaders were reluctant to acknowledge that their countries faced a drug threat Two decades ago most Caribbean leaders were reluctant to acknowledge that their countries faced a drug threat. But the severity of the problem grew until the danger was obvious inside and outside the area. For instance, at a meeting on criminal justice in June 2000, which was attended by officials of Europe, Canada, the Caribbean Basin, and the United States, the attorney general of Trinidad and Tobago spoke of "the direct nexus between illegal drugs and crimes of violence, sex crimes, domestic violence, maltreatment of children by parents, and other evils," and remarked that "aside from the very visible decimation of our societies caused by drug addiction and drug-related violence, there is another insidious evil: money laundering." Engagement Challenges Leaders in the Caribbean and the United States share a common assessment of the principal security concerns in the area: drugs, border disputes, poverty, corruption, natural disasters, illegal migration, insurgencies, and the environment. Consistent with this view, SOUTHCOM is focused on counterdrug operations, peacekeeping, humanitarian assistance, and disaster relief. One basic challenge in redesigning policy or strategy is determining which instruments and modalities should be changed. Except for Cuba, engagement does not warrant revamping existing practices. Some things work well and should be retained; others do not and should be modified. This discussion addresses both types. Robert Pastor, who served on the National Security Council staff during the Carter administration, noted that Caribbean nations are too small and poor to directly challenge the United States. What really moved Washington was the threat of powerful adversaries from other parts of the world forging relationships in the area that facilitated the harassment of or attack on the United States or its neighbors. "When the threat diminishes," he remarked, "so does U.S. interest. That accounts for the apparent cycle between preoccupation at moments of intense geopolitical rivalry and neglect at times of geopolitical calm." Today's relative geopolitical calm justifies the concern of scholars and statesmen about the likelihood of a new phase of benign neglect or even worse. Hence it is important to highlight the challenge of staying engaged in both symbolic and substantive terms. Some years ago, the prime minister of St. Vincent and the Grenadines declared: "We have to behave like Grenada or Fiji to get attention, and when we stop misbehaving we are left to languish in blissful obsecurity." Engagement demands flexibility and adaptability. For some missions, political expediency may require that nonmilitary personnel take the lead, or perhaps coastguardsmen as opposed to soldiers or marines. And flexibility and adaptability may be compromised by pushing the economy of force envelope too far. Also, engagement programs must not mistake silence for satisfaction. In addition, engagement requires the first team. U.S. leaders must not relegate decisionmaking to uninformed interns, junior staffers, or freshman bureaucrats. Colombia, Cuba, Haiti, and Venezuela are clearly hot spots that should be watched closely; but so must other countries. Guyana bears scrutiny because of resurgent territorial claims, the impact of that dispute on investment and development (especially because U.S. and Canadian investors are involved), the likelihood of political instability, and the influence of drug trafficking. Another concern is violent crime in Jamaica, some of which affects foreign tourists and investors. In addition, Jamaican organized crime poses transnational dangers to law enforcement and economic interests. Drug trafficking and economic deprivation could also lead to renewed political instability. The Dominican Republic faces issues of drug traffic, transnational crime, illegal migration, and political instability as that nation strives to translate rapid economic growth into less deprivation. The economy grew by 6.5 percent in 2000, 8.3 percent in 1999, and 7.3 percent in 1998, yet many Dominicans do not benefit from this wealth as some 20 percent of the country's 8.5 million people live in poverty. Puerto Rico also warrants attention. Although a domestic question for the United States, Vieques detracts from U.S. conflict resolution credibility. While Vieques is allegedly indispensable for Navy training, this issue highlights a troubling aspect of relations between the mainland and the island. Programs must operate on several tracks encompassing broad interagency activities. Multifaceted engagement is especially vital in counternarcotics efforts. Countermeasures must be multi-level--regional and international as well as national--because drug operations are transnational. Moreover, the measures must be implemented on a multiagency level to grapple with jurisdictional, legal, social, and economic issues precipitated by the drug problem. In addition to government agencies, a range of corporations, nongovernmental organizations, and international bodies such as the Organization of American States and the U.N. International Drug Control Program must play critical roles. Multilateral security measures do not preclude bilateralism. Indeed, such measures may be more politically expedient because they can be designed and executed faster. There may be budget incentives to act quickly. Moreover, in light of resource difficulties, a premium should be put on regulatory and operational aspects of interagency work to guard against turf and prestige battles. Whether it is an issue of drugs, territorial disputes, migrant flows, or the environment, engagement should be pursued on the basis of mutual interest. This is not always achievable. Sometimes even leaders of comparatively wealthy states, though partners, are unwilling to agree to collective efforts because of concern about their impact. Domestic factors such as political change and public opinion often make it difficult to honor or renew pledges. But despite such complications, leaders must not let the possibility of conflict undermine cooperation. There are high stakes for the United States in the Caribbean. The stakes are also high for the Caribbean countries. New defense and foreign policy initiatives may encourage effective engagement and investment of the resources to match the national interest in an area that represents a global crossroads and an essential element for regional stability.

#### Nuclear war

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(Jeffrey E, The Dangers of Turning Inward, Truth About Trade & Technology, 3-3-09, http://www.truthabouttrade.org/content/view/13454/54/lang,en/)

The point is, economic nationalism, with its implicit autarchic and save-yourself character, embodies exactly the wrong spirit and runs in precisely the wrong direction from the global system that will be necessary to create the future we all want. As happened in the 1930s, economic nationalism is also sure to poison geopolitics. Governments under economic pressure have far fewer resources to take care of their citizens and to deal with rising anger and social tensions. Whether or not they are democracies, their tenure can be threatened by popular resentment. The temptation for governments to whip up enthusiasm for something that distracts citizens from their economic woes -- a war or a jihad against unpopular minorities, for example -- is great. That's not all. As an economically enfeebled South Korea withdraws foreign aid from North Korea, could we see an even more irrational activity from Pyongyang? As the Pakistani economy goes into the tank, will the government be more likely to compromise with terrorists to alleviate at least one source of pressure? As Ukraine strains under the weight of an IMF bailout, is a civil war with Cold War overtones between Europe and Russia be in the cards? And beyond all that, how will economically embattled and inward-looking governments be able to deal with the critical issues that need global resolution such as control of nuclear weapons, or a treaty to manage climate change, or help to the hundreds of millions of people who are now falling back into poverty?

#### Best studies prove

Jedidiah **Royal 10**, Director of Cooperative Threat Reduction at the U.S. Department of Defense, “Economic Integration, Economic Signalling And The Problem Of Economic Crises”, in Economics of War and Peace: Economic, Legal and Political Perspectives, ed. Goldsmith and Brauer, p. 213-215

Second, on a dyadic level. Copeland's (1996. 2000) theory of trade expectations suggests that 'future expectation of trade' is a significant variable in understanding economic conditions and security behaviour of states. He argues that interdependent states are likely to gain pacific benefits from trade so long as they have an optimistic view of future trade relations. However, if the expectations of future trade decline, particularly for difficult to replace items such as energy resources, the likelihood for conflict increases, as states will be inclined to use force to gain access to those resources. Crises could potentially be the trigger for decreased trade expectations either on its own or because it triggers protectionist moves by interdependent states.4 Third, others have considered the link between economic decline and external armed conflict at a national level. Blomberg and Hess (2002) find a strong correlation between internal conflict and external conflict, particularly during periods of economic downturn. They write, The linkages between internal and external conflict and prosperity are strong and mutually reinforcing. Economic conflict tends to spawn internal conflict, which in turn returns the favour. Moreover, the presence of a recession lends to amplify the extent to which international and external conflicts self-rein force each other. (Blombcrj! & Hess. 2002. p. 89) Economic decline has also been linked with an increase in the likelihood of terrorism (Blomberg. Hess. & Weerapana, 2004). which has the capacity to spill across borders and lead to external tensions. Furthermore, crises generally reduce the popularity of a sitting government. "Diversionary theory" suggests that, when facing unpopularity arising from economic decline, sitting governments have increased incentives to fabricate external military conflicts to create a 'rally around the flag' effect. Wang (1996), DeRouen (1995), and Blombcrg. Mess, and Thacker (2006) find supporting evidence showing that economic decline and use of force are at least indirectly correlated. Gelpi (1997), Miller (1999). and Kisangani and Pickering (2009) suggest that the tendency towards diversionary tactics arr greater for democratic states than autocratic states, due to the fact that democratic leaders are generally more susceptible to being removed from office due to lack of domestic support. DeRouen (2000) has provided evidence showing that periods of weak economic performance in the United States, and thus weak Presidential popularity, are statistically linked to an increase in the use of force.

## leadership

#### Massive expansion of nuclear power’s inevitable worldwide – that causes cascading prolif

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Nuclear energy is a twentieth-century innovation but until recently has not spread beyond a relatively small number 0F industrialized nations (see maps on pages 4 5). All this is about to change. With global electricity demand increasing dramatically, greenhouse gas emissions, and energy security becoming national priorities, developed and developing countries alike are reexamining nuclear energy as a means of providing a reliable E scalable source of low-carbon power. The International Energy Agency (IEA) projects that global electricity demand will increase 2.2 percent a year to 2035, with about 80 percent of that growth occurring in emerging economies outside the Organization for Economic Cooperation £ Development (OECD).' Even if new policy initiatives are introduced to lower carbon dioxide (CO2) emissions Q combat global climate change, global energy-related CO2 emissions are expected to increase 21 percent between 2008 2035.1 Emerging market economies account For all of this projected increase in emissions. In the face of rising prices and increasing volatility in the oil market, many of these economies have shifted their attention to nuclear energy as a means of reducing dependence on oil (often a major source of their power generation), improving their balance of payments, and bolstering national energy security.’ Currently, 440 reactors with a total capacity of 375 gigawatts (G\Wc) arc in operation worlclwicle.\* As of March 2011, 65 nuclear reactor units, with a total capacity of 63 G\Ve, are under construction.5 As of April 2011, 158 projects are also on order or planned and 326 proposed." These preparations For replacing or expanding reactor ﬂeets Q For new entries to the marketplace follow a decades-long lull in construction suggest a “nuclear renaissance” has begun. \Y/hile “renaissance” implies a revival or return to a better time. the global expansion of nuclear energy in the coming decades will differ in several resects from the way civilian nuclear power developed between the late 1950s mid-19805. First, the scope and pace of this new deployment could be signiﬁcantly larger than in previous periods of expansion: some recent analyses put installed nuclear capacity up at 550—850 G\Ve by 2035. depending on assumptions about the implementation of low-carbon energy policiesf In IEA projections, a 50 per- cent cut in energy-related CO, emissions by 2050 would require global capacity to reach 1,200 G\Ve, a net addition of 30 G\Ve each year over the next forty years.“ To put this ﬁgure into perspective, during the period of nuclear p0wer’s most rapid expansion (1981-90). capacity increased by only 20 G\Ve a year, slowing to an annual average of 4 G\X/e from 1991 to 2006." To achieve large- scale reductions in energy—related CO: emissions, nuclear capacity must there- lore grow not only faster but also For several decades longer than during nuclear energy's previous “golden age." (As the preface indicates, safety concerns arising in the aftermath ofthe Fukushima accident will slow or scale back nuclear power expansion globally in the short term. At the same time, the longer-term impact of Fukushima on global nuclear power expansion will be less adverse, especially in emerging market countries.) Also different today is the number of countries seeking to build their ﬁrst nuclear power reactor. Some sixty-ﬁve countries have expressed interest in or are actively planning for nuclear power."' As the International Atomic Energy Agency (IAEA) points out, however, most of these countries are merely “con- sidering” the range of issues involved in nuclear power development. Many of them cannot realistically afford the large costs associated with civilian nuclear power programs. According to some analyses, countries with a GDP ofless than $50 billion could not spend several billion dollars building a reactor." ln addi- tion, many aspirant countries still lack the electricity grids required For nuclear power: electricity systems with a capacity below l0 G\Ve are unlikely to be able to accommodate a nuclear reactor.“ Some countries could address this issue by expanding electricity interconnections with neighboring states or developing ower export arrangements; however, these alternatives are not widely available in any case would take time to implement. At the same time, a number of countries have credible plans to become new nuclear energy states (NNES). The IAEA has indicated that ten to twenty-ﬁve countries might begin operating their ﬁrst plants by 2030, whereas since Cher- nobyl only thrce—China, Mexico, Romania—havc brought nuclear plants online for the ﬁrst time.” The following list shows the stages of progress of eleven emerging market countries in their ellorts to develop a civilian nuclear energy programz“ —Power reactors under construction: Iran.“ —Contracts signed, legal regulatory infrastructure well developed: United Arab Emirates (UAE), Turkey. —Committed plans, legal Q regulatory infrastructure developing: Vietnam, jordan. —\Well-developed plans but commitment pending: Thailand. Indonesia. Egypt, Kazakhstan. —Developing plans: Saudi Arabia, Malaysia. Emerging market nations entertaining the construction of new nuclear power capacity lace several critical issues. Domestically, each must establish strong institutions and viable regulatory frameworks addressing health, safety, prolif- eration, environmental concerns while ensuring that adequate human ﬁnancial resources are available for these tasks. Even if a state is willing to buy a nuclear reactor on a “turnkey” basis (paying For an outside operator to build Q run the system), it must still train its own nationals in these various respects Q establish a strong academic industrial culture in all aspects of commercial nuclear operations in order to achieve a sound, sustainable program. The NNES will need to build these capabilities in a sufficient timely manner. New States One of the biggest challenges in any expansion of the civilian nuclear sector is that of maintaining and strengthening the global regime for nuclear proliferation. The changing geopolitical J security environment, combined with the political instability of many regions countries that aspire to develop civilian nuclear reactor technology, has already raised proliferation concerns. Nuclear power reactors could become attractive targets for terrorists, who might also seek access to ﬁssile material for radiological dispersal devices (“dirty bombs”) or for nuclear weapons. With such materials more widely available, the proliferation risks could mount. As commercial enrichment and recycling programs multiply, countries may be tempted also to develop latent nuclear weapons capabilities, especially if they aspire to attain regional predominance, international standing, or the capabilities of regional rivals. An expansion of nuclear energy could further tax an already stressed proliferation regime. In light ofArticle IV of the Nuclear Treaty (NPT), wl1icl1 states that the treat shall not aﬁect the “inalienable right . . . to develop research, production duse of nuclear energy For peaceful purposes without discrimination . . . the right to partici ate in, the fullest possible exchange of equipment, materials H scientiﬁc ii technological information For the peaceful uses olinuclear energy, ” some nations are considering acquisition of fuel cycle capabilities as a way to avoid further dependence on foreign suppliers when they develop nuclear power.“ The NPT contains no provisions to restrict acquisition of such capabilities, although members of the Nuclear Suppliers Group (a voluntary group of nations that restricts nuclear exports) have long practiced restraint on technology transfers of sensitive components of the Fuel cycle. A sharp increase in the demand for nuclear fuel could enhance the commercial attractiveness of uranium enrichment reprocessing, enticing new entrants into the market." Nations with large uranium resources might seek to add value to their uranium exports by moving further up the chain of produc- tion or by expanding current capabilities (Australia, Canada, Kazakhstan, South Africa have all discussed this option recently). Even if the high cost of Fuel cycle activities proves to be a disincentive to their development, the NNES— especially in emerging markets—may consider Fuel supply security exercis- ing sovereign rights under Article IV of the NPT more relevant than economic drivers in their decisions about enrichment or reprocessing.“ With governments playing an increasing role in securing and meeting nuclear contracts, political motivations might also enter into assessments of the nuclear capabilities neces- sary for recipient countries. The great danger in the race to build out new capacity is that some new players may not take proliferation concerns as seriously as existing service providers. To address these issues, there has been a reinvigorated discussion of multilat- eral nuclear approaches (MN/\s). M NAs establish a framework to safeguard Arti- cle IV rights, speciﬁcally by limiting the diffusion ofsensitive nuclear materials E technologies while concurrently guaranteeing long-term supply of nuclear fuel to civilian nuclear power programs. Some steps in this direction include two recently approved fuel banks: the Russian-backed lnternational Uranium Enrich- ment Center in Angarsk the ME/\ Nuclear Threat Initiative Fuel Bank.” The institutional challenges to the regime are compounded both by the actions of rogue states such as Iran’s clandestine nuclear program and North Korea’s nuclear weapons testing Q new uranium enrichment pro- gram, Q by non-state activities such as the operations ofblack market nuclear networks arranged by Pakistani scientist A. Khan. Conﬁdence in the regime’s ability to respond to resolve proliferation threats has thus fallen. New technologies may put further stress on the system. Particularly worrying are the expansion of centrifuge technology, commercialization of the laser enrichment process, development and deployment of next-generation reprocessing techniques that require advanced safeguards, and the potential spread of fast reactors. Although the impact of these dynamics is tlifﬁcult to foresee, the proliferation regime needs to keep pace with the rapidly changing, complex nuclear market, especially those developments activities that facilitate the expansion of uranium enrichment and spent fuel reprocessing. This is a major challenge for a regime already under stress.

#### The spread of enrichment and reprocessing collapse the entire nonproliferation regime

Anatoly S. Diyakov 10, Professor of Physics and Director of the Center for Arms Control Energy and Environmental Studies at the Moscow Institute of Physics, “The nuclear “renaissance” & preventing the spread of enrichment & reprocessing technologies: a Russian view”, Dædalus Winter 2010

The anticipated growth of nuclear power around the world may lead to the spread of nuclear fuel cycle technologies as well. The expectations associated with a renewed interest in nuclear power and the rate of nuclear power growth in the world may be exaggerated; at the very least we can expect that the growth would occur not immediately, but over a long period. Nevertheless, there are definite concerns about the implications of nuclear power expansion for the nuclear nonproliferation regime. Driving these concerns is a sense that, beyond interest in nuclear power, developing countries also have an interest in retaining their right under the Nuclear Non-Proliferation Treaty (npt) to possess nuclear fuel cycle technologies. A potential spread of nuclear fuel cycle technologies, especially technologies for uranium enrichment and for reprocessing spent fuel to separate plutonium, poses a serious concern to the nuclear nonproliferation regime because enrichment and reprocessing capabilities give states the capability to produce fissile materials for weapons. This is not a new problem. Indeed, as early as 1946, the Acheson-Lillenthal report declared that proliferation risks are inherent to the nuclear fuel cycle. If nations engage in fuel cycle activities it increases the risk of: • Spread of sensitive technologies from declared facilities, resulting in their illegal transfer to other entities; • Diversion of nuclear materials from declared fuel cycle facilities; • Running a military program at undeclared fuel cycle facilities; and • Breakout–that is, withdrawal from the npt and the subsequent use of safeguarded nuclear facilities for military purposes. The reality of these dangers was recently demonstrated by North Korea and the A.Q. Khan network. International Atomic Energy Agency (iaea) Director General Mohamed ElBaradei has said that the fuel cycle is the “Achilles heel” of the nonproliferation system.8 Some countries have already declared their right to acquire enrichment and reprocessing technologies. This right is in fact secured for countries party to the npt. The npt does not restrict peaceful development and use of nuclear power; Article IV of the Treaty asserts, “Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes.” However, in ensuring the right to peaceful use of nuclear energy, the npt also imposes specific obligations upon its member states. In accordance with Article II of the npt, “Each non-nuclearweapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly. ” Article III requires that each Treaty participant state “undertakes to accept safeguards . . . for the exclusive purpose of veri½cation of the ful½llment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons.” The right to develop the nuclear fuel cycle, afforded by the npt, is considered by some to be a loophole in the nonproliferation regime. This loophole, and recent violations of commonly accepted obligations by certain countries, raises questions about the npt’s capacity to protect international security adequately from threats that may occur. It would be wrong to blame the authors of the npt for this loophole. Over the four decades that have passed since the npt ½rst came into effect, the world has changed dramatically. The npt to a large extent was initially intended to prevent creation of nuclear weapons by industrially advanced countries such as West Germany, Italy, Sweden, Switzerland, South Korea, Taiwan, and others, while simultaneously providing them the bene½t of peaceful nuclear use and security guarantees. When the npt was being negotiated in the 1960s, hardly anyone could have imagined that, with time, the main actors in proliferation and the dangers arising from it would come to be those countries that had recently become liberated from Europe’s colonial dominion (at the time called “developing” or “third-world” countries) and also non-state entities– namely, terrorist organizations. Considering that objective forces are compelling more and more countries to turn to nuclear energy to satisfy their energy needs, and that they have the right to develop the nuclear fuel cycle, it is necessary to search for solutions that, on the one hand, would prevent proliferation of sensitive nuclear technologies and, on the other hand, would ensure interested countries guaranteed access to external sources of nuclear fuel cycle services and products.

#### Squo nuclear power means quick breakout—asymmetric development of arsenals creates imbalances that undermine deterrent relationships

Sokolski 9

Henry Sokolski, Executive Director of the Nonproliferation Policy Education Center, 6/1/2009, Avoiding a Nuclear Crowd, http://www.hoover.org/publications/policy-review/article/5534

Finally, several new nuclear weapons contenders are also likely to emerge in the next two to three decades. Among these might be Japan, North Korea, South Korea, Taiwan, Iran, Algeria, Brazil (which is developing a nuclear submarine and the uranium to fuel it), Argentina, and possibly Saudi Arabia (courtesy of weapons leased to it by Pakistan or China), Egypt, Syria, and Turkey. All of these states have either voiced a desire to acquire nuclear weapons or tried to do so previously and have one or more of the following: A nuclear power program, a large research reactor, or plans to build a large power reactor by 2030.

With a large reactor program inevitably comes a large number of foreign nuclear experts (who are exceedingly difficult to track and identify) and extensive training, which is certain to include nuclear fuel making.19 Thus, it will be much more difficult to know when and if a state is acquiring nuclear weapons (covertly or overtly) and far more dangerous nuclear technology and materials will be available to terrorists than would otherwise. Bottom line: **As more states bring large reactors on line more will become nuclear-weapons-ready** — i.e., **they could come within months of acquiring nuclear weapons** if they chose to do so.20 As for nuclear safeguards keeping apace, neither the iaea’s nuclear inspection system (even under the most optimal conditions) nor technical trends in nuclear fuel making (e.g., silex laser enrichment, centrifuges, new South African aps enrichment techniques, filtering technology, and crude radiochemistry plants, which are making successful, small, affordable, covert fuel manufacturing even more likely)21 afford much cause for optimism.

This brave new nuclear world will stir existing security alliance relations more than it will settle them: In the case of states such as Japan, South Korea, and Turkey, it could prompt key allies to go ballistic or nuclear on their own.

Nuclear 1914

At a minimum, **such developments will be a departure from whatever stability existed during the Cold War**. After World War II, there was a clear subordination of nations to one or another of the two superpowers’ strong alliance systems — the U.S.-led free world and the Russian-Chinese led Communist Bloc. The net effect was relative peace with only small, nonindustrial wars. This alliance tension and system, however, no longer exist. Instead, we now have one superpower, the United States, that is capable of overthrowing small nations unilaterally with conventional arms alone, associated with a relatively weak alliance system ( nato) that includes two European nuclear powers (France and the uk). nato is increasingly integrating its nuclear targeting policies. The U.S. also has retained its security allies in Asia (Japan, Australia, and South Korea) but has seen the emergence of an increasing number of nuclear or nuclear-weapon-armed or -ready states.

So far, the U.S. has tried to cope with independent nuclear powers by making them “strategic partners” (e.g., India and Russia), nato nuclear allies (France and the uk), “non-nato allies” (e.g., Israel and Pakistan), and strategic stakeholders (China); or by fudging if a nation actually has attained full nuclear status (e.g., Iran or North Korea, which, we insist, will either not get nuclear weapons or will give them up). In this world, every nuclear power center (our European nuclear nato allies), the U.S., Russia, China, Israel, India, and Pakistan could have significant diplomatic security relations or ties with one another but none of these ties is viewed by Washington (and, one hopes, by no one else) as being as important as the ties between Washington and each of these nuclear-armed entities (see Figure 3).

There are limits, however, to what this approach can accomplish. Such a weak alliance system, with its expanding set of loose affiliations, risks becoming analogous to the international system that failed to contain offensive actions prior to World War I. Unlike 1914, there is no power today that can rival the projection of U.S. conventional forces anywhere on the globe. But in a world with an increasing number of nuclear-armed or nuclear-ready states, this may not matter as much as we think. In such a world, the **actions of just one or two states** or groups that might threaten to disrupt or overthrow a nuclear weapons state **could check U.S. influence or ignite a war Washington could have difficulty containing**. No amount of military science or tactics could assure that the U.S. could disarm or neutralize such threatening or unstable nuclear states.22 Nor could diplomats or our intelligence services be relied upon to keep up to date on what each of these governments would be likely to do in such a crisis (see graphic below):

Combine these proliferation trends with the others noted above and one could easily create the perfect nuclear storm: **Small differences between nuclear competitors** that would **put all actors on edge**; an overhang of nuclear materials **that could be called upon to break out** or significantly ramp up existing nuclear deployments; and a variety of potential new nuclear actors developing weapons options in the wings.

In such a setting, the military and nuclear **rivalries between** states could easily **be much more intense than before**. Certainly **each nuclear state’s military would place a**n even higher **premium** than before **on being able to weaponize** its military and **civilian surpluses quickly**, to deploy forces that are survivable, and to have forces that can get to their targets and destroy them with high levels of probability. The advanced military states will also be even more inclined to develop and deploy enhanced air and missile defenses and long-range, precision guidance munitions, and to develop a variety of preventative and preemptive war options.

Certainly, in such a world, relations between states could become far less stable. **Relatively small developments** — e.g., Russian support for sympathetic near-abroad provinces; Pakistani-inspired terrorist strikes in India, such as those experienced recently in Mumbai; new Indian flanking activities in Iran near Pakistan; Chinese weapons developments or moves regarding Taiwan; state-sponsored assassination attempts of key figures in the Middle East or South West Asia, etc. — **could easily prompt nuclear weapons deployments with “strategic” consequences** (**arms races, strategic miscues, and** even **nuclear war**). As Herman Kahn once noted, in such a world “every quarrel or difference of opinion may lead to violence of a kind quite different from what is possible today.”23 In short, we may soon see a future that neither the proponents of nuclear abolition, nor their critics, would ever want. None of this, however, is inevitable.

#### Prolif cascades cause militarization of disputes—escalates to great power war

Kroenig 9

Matt Kroenig, assistant professor of Government at Georgetown University and a Stanton Nuclear Security Fellow at the Council on Foreign Relations, November 2009, Beyond Optimism and Pessimism: The Differential Effects of Nuclear Proliferation, http://belfercenter.hks.harvard.edu/publication/19671/beyond\_optimism\_and\_pessimism.html

**Nuclear proliferation** can **embolden new nuclear states**, **triggering regional instability that could** potentially **threaten** the **interests of power-projecting states and** even **entrap them in regional disputes**. New nuclear weapon states may be more aggressive and this newfound assertiveness can result in regional instability. I define regional instability as a heightened frequency (but not necessarily the intensity) of militarized interstate disputes among states in a given geographical region. The threat that regional instability poses to power-projecting states is different from the concern about international instability expressed by the proliferation pessimists. Pessimists assume that international instability is bad in and of itself – and they may be right. But, power-projecting states have a different concern. They worry that nuclear proliferation will set off regional instability and that, because they have the ability to project power over the new nuclear weapon state, they will be compelled to intervene in a costly conflict. Power-projecting states could feel the need to act as a mediator between nuclear-armed disputants, provide conventional military assistance to one of the parties in the dispute, or because they have the ability to put boots on the ground in the new nuclear state, potentially be drawn into the fighting themselves.

There is direct evidence that nuclear weapons can contribute to regional instability. Robert Rauchhaus has demonstrated that **nuclear weapon states are more likely to engage in conflict than nonnuclear weapon states**. 46 Michael Horowitz extends this analysis to show that **aggressiveness is most pronounced in new nuclear states** **that have less experience with nuclear diplomacy**.47 These related findings are not due to the fact that dispute-prone states are more likely to acquire nuclear weapons; the scholars carefully control for a state’s selection into nuclear status. Rather, the findings demonstrate that nuclear weapons increase the frequency with which their possessors participate in militarized disputes. Qualitative studies have also provided supporting evidence of nuclear weapons’ potentially destabilizing effects. Research on internal decision-making in Pakistan reveals that Pakistani foreign policymakers may have been emboldened by the acquisition of nuclear weapons, **encouraging them to initiate militarized disputes** against India.48

Proliferation optimists counter that nuclear proliferation should increase regional stability, but the most recent empirical investigations undermine the stronger versions of the optimism argument.49 While nuclear-armed states may be less likely to experience full-scale war providing some support for the optimist position, **the preponderance of evidence suggests that nuclear-armed states are more likely to engage in** other types of **militarized disputes**.50 This is true whether only one state or all of the contentious actors in a region possess nuclear weapons.51

Furthermore, for the sake of argument, even if nuclear proliferation does have stabilizing effects as optimists argue, as long as regional conflict among nuclear-armed states is possible, the basic argument presented here still holds. This is because power-projecting states may still feel compelled to intervene in the conflicts that do occur. These are conflicts that they perhaps **could have avoided had nuclear weapons been absent**.

There is direct evidence that regional conflicts involving nuclear powers can encourage power-projecting states to become involved in nuclear disputes. Secretary of State Henry Kissinger was reluctant to aid Israel in the 1973 Yom Kippur War until Israeli Prime Minister Golda Meir threatened that, without U.S. assistance, she might be forced to use nuclear weapons against the Arab armies.52 In response, Kissinger reversed his decision and provided emergency aid to the Israeli DefenseForces.53 The Soviet Union also considered a military intervention to help its Arab proxies in the Yom Kippur War, causing the United States to go on nuclear alert, and leading leaders in both Moscow and Washington to consider the very real possibility that a conflict involving a regional nuclear power could spiral into a superpower war.54 Similarly, in 1999 and 2002, the United States became caught in diplomatic initiatives to prevent nuclear war in crises between the nuclear- armed countries of India and Pakistan.55

Indeed, the expectation that powerful states will intervene in conflicts involving a nuclear-armed state is so firmly ingrained in the strategic thinking of national leaders that small nuclear powers actually incorporate it into their strategic doctrines. South Africa’s nuclear doctrine envisioned, in the event of an imminent security threat, the detonation of a nuclear weapon, not against the threatening party, but over the Atlantic Ocean in an attempt to jolt the United States into intervening on South Africa’s behalf.56 Israel’s nuclear doctrine was also constructed along similar lines. While the Israelis are notoriously silent about the existence and purpose of their nuclear arsenal, Francis Perrin, a French official who assisted in the development of Israel’s nuclear program in the 1950s and 1960s, explained that Israel’s arsenal was originally aimed “against the Americans, not to launch against America, but to say ‘If you don’t want to help us in a critical situation, we will require you to help us. Otherwise, we will use our nuclear bombs.’”57 Similarly, Pakistan’s surprise raid on Indian-controlled Kargil in 1999 was motivated partly by the expectation that Pakistan would be able to retain any territory it was able to seize quickly, because Pakistani officials calculated that the United States would never allow an extended conflict in nuclear South Asia.58

For these reasons, power-projecting states worry about the effect of nuclear proliferation on regional stability. U.S. officials feared that nuclear proliferation in Israel could embolden Israel against its Arab enemies, or entice Arab states to launch a preventive military strike on Israel’s nuclear arsenal. In a 1963 NIE on Israel’s nascent nuclear program, the consensus view of the U.S. intelligence community was that if Israel acquired nuclear weapons, “Israel’s policy toward its neighbors would become more rather than less tough...it would seek to exploit the psychological advantage of its nuclear capability to intimidate the Arabs.”59 President Kennedy concurred. In a letter to Israeli Prime Minister David Ben-Gurion, Kennedy wrote that Israel should abandon its nuclear program because Israel’s “development of such (nuclear) weapons would dangerously threaten the stability of thearea.”60 Similarly, in the case of China’s nuclear program, U.S. officials believed that a nuclear-armed China would “be more willing to take risks in military probing operations because of an overoptimistic assessment of its psychological advantage.”61

More recently, U.S. officials have continued to fear the effect of nuclear proliferation on regional stability. In a 1986 Top Secret CIA Assessment, U.S. intelligence analysts predicted that a nuclear North Korea would have “a free hand to conduct paramilitary operations without provoking a response.”62 Similarly, a U.S. expert testified before Congress in 2006 that “A nuclear arsenal in the hands of Iran’s current theocratic regime will be a source of both regional and global instability.”63

U.S. officials assessed that regional instability set off by nuclear proliferation could compel them to intervene directly in regional conflicts. In the early 1960s, U.S. officials speculated that Israel could potentially leverage its nuclear arsenal to compel the United States to intervene on its behalf in Middle Eastern crises.64 Similarly, in 1965, Henry Rowen, an official in the Department of Defense, assessed that if India acquired nuclear weapons, it could lead to a conflict in South Asia “with a fair chance of spreading and involving the UnitedStates.”65 At the time of writing, U.S. defense strategists are planning for the possibility that the United States may be compelled to intervene in regional conflicts involving a nuclear-armed Iran or North Korea and their neighbors.66

Leaders in power-projecting states also fear that **regional instability set off by nuclear** proliferation could entrap power-projecting states in a **great power war**. Other power- projecting states, facing a mirror-image situation, may feel compelled to intervene in a crisis to secure their own interests, **entangling multiple great powers in a regional conflict**. In a 1963 NIE, U.S. intelligence analysts assessed that “the impact of (nuclear proliferation in the Middle East) will be the possibility that hostilities arising out of existing or future controversies could escalate into a confrontation involving the major powers.”67 President Johnson believed that a nuclear Israel meant increased Soviet involvement in the Middle East and perhaps superpower war.68 If historical experience provides a guide, U.S. strategists at the time of writing are undoubtedly concerned by the possibility that China may feel compelled to intervene in any conflict involving a nuclear-armed North Korea, making the Korean Peninsula another dangerous flash-point in the uncertain Sino-American strategic relationship.

#### Cold War no longer applies—nuclear war

Cimbala 8

Stephen Cimbala, Ph.D., Penn State Brandywine Political Science Distinguished Professor, 2008, Anticipatory Attacks: Nuclear Crisis Stability in Future Asia, Comparative Strategy Volume 27, Issue 2

The spread of nuclear weapons in Asia presents a complicated mosaic of possibilities in this regard. **States with nuclear forces of variable force structure, operational experience, and command-control systems** will be thrown into a **matrix of complex political, social, and cultural** **crosscurrents contributory to the possibility of war**. In addition to the existing nuclear powers in Asia, others may seek nuclear weapons if they feel threatened by regional rivals or hostile alliances. Containment of nuclear proliferation in Asia is a desirable political objective for all of the obvious reasons. Nevertheless, the present century is unlikely to see the nuclear hesitancy or **risk aversion that marked the Cold War**, in part, because the military and political discipline imposed by the Cold War superpowers no longer exists, but also because states in Asia have new aspirations for regional or global respect. 12

The spread of ballistic missiles and other nuclear-capable delivery systems in Asia, or in the Middle East with reach into Asia, is especially dangerous because **plausible adversaries live close together and are already engaged in ongoing disputes about territory** or other issues. 13 The Cold War Americans and Soviets required missiles and airborne delivery systems of intercontinental range to strike at one another's vitals. But short-range ballistic missiles or fighter-bombers suffice for India and Pakistan to launch attacks at one another with potentially “strategic” effects. China shares borders with Russia, North Korea, India, and Pakistan; Russia, with China and North Korea; India, with Pakistan and China; Pakistan, with India and China; and so on.

**The** short flight times **of ballistic missiles between** the cities or military forces of **contiguous states means that very little time will be available for warning and attack assessment** by the defender. Conventionally armed missiles could easily be mistaken for a tactical nuclear first use. Fighter-bombers appearing over the horizon could just as easily be carrying nuclear weapons as conventional ordnance. In addition to the challenges posed by shorter flight times and uncertain weapons loads, potential victims of nuclear attack in Asia may also have first strike–**vulnerable forces and command-control systems** that **increase decision pressures for rapid, and** possibly **mistaken, retaliation**.

This potpourri of possibilities challenges conventional wisdom about nuclear deterrence and proliferation on the part of policymakers and academic theorists. For policymakers in the United States and NATO, spreading nuclear and other weapons of mass destruction in Asia could profoundly shift the geopolitics of mass destruction from a European center of gravity (in the twentieth century) to an Asian and/or Middle Eastern center of gravity (in the present century). 14 This would profoundly shake up prognostications to the effect that wars of mass destruction are now passe, on account of the emergence of the “Revolution in Military Affairs” and its encouragement of information-based warfare. 15 Together with this, there has emerged the argument that large-scale war between states or coalitions of states, as opposed to varieties of unconventional warfare and failed states, are exceptional and potentially obsolete. 16 **The spread of WMD** and ballistic missiles in Asia could **overturn** these **expectations for the obsolescence** or marginalization **of major interstate warfare**.

For theorists, the argument that the spread of nuclear weapons might be fully compatible with international stability, and perhaps even supportive of international security, may be less sustainable than hitherto. 17 Theorists optimistic about the ability of the international order to accommodate the proliferation of nuclear weapons and delivery systems in the present century have made several plausible arguments based on international systems and deterrence theory. First, nuclear weapons may make states more risk averse as opposed to risk acceptant, with regard to brandishing military power in support of foreign policy objectives. Second, if states' nuclear forces are second-strike survivable, they contribute to reduced fears of surprise attack. Third, the motives of states with respect to the existing international order are crucial. Revisionists will seek to use nuclear weapons to overturn the existing balance of power; status quo–oriented states will use nuclear forces to support the existing distribution of power, and therefore, slow and peaceful change, as opposed to sudden and radical power transitions.

These arguments, for a less alarmist view of nuclear proliferation, take comfort from the history of nuclear policy in the “first nuclear age,” roughly corresponding to the Cold War. 18 Pessimists who predicted that some thirty or more states might have nuclear weapons by the end of the century were proved wrong. However, **the Cold War is a dubious precedent for the control of nuclear weapons** spread outside of Europe. The military and security agenda of the Cold War was dominated by the United States and the Soviet Union, especially with regard to nuclear weapons. Ideas about mutual deterrence based on second-strike capability and the deterrence “rationality” according to American or allied Western concepts might be inaccurate guides to the avoidance of war outside of Europe.

#### A strong SMR industry’s key to US leadership, market share, and cradle to grave

Mandel 9

(Jenny – Scientific American, Environment & Energy Publishing, LLC, “Less Is More for Designers of "Right-Sized" Nuclear Reactors” September 9, 2009, http://www.scientificamerican.com/article.cfm?id=small-nuclear-power-plant-station-mini-reactor)

Tom Sanders, president of the American Nuclear Society and manager of Sandia National Laboratories' Global Nuclear Futures Initiative, has been stumping for small rectors for more than a decade. American-made small reactors, Sanders insists, can play a central role in global nonproliferation efforts. "Our role at Sandia is the national security-driven notion that it's in the interests of the U.S. to be one of the dominant nuclear suppliers," Sanders said. While U.S. companies have been exiting the industry over the past decades as government and popular support for new construction has waned, Sanders maintains that **strong U.S. participation in the nuclear energy marketplace** would give diplomats a new tool to use with would-be nuclear powers. "It's hard to tell Iran what to do if you don't have anything Iran wants," he explained. Sanders said mini-reactors are ideal to sell to developing countries that want to boost their manufacturing might and that would otherwise look to other countries for nuclear technologies**. If the U**nited **S**tates **is not participating in that market**, he said, **it becomes hard to steer buyers away from technologies that pose greater proliferation risks.** Sanders been promoting this view since the 1990s, he said, when he realized "we were no longer selling nuclear goods and services, so we could no longer write the rules." The domestic nuclear industry had basically shut down, with no new construction in decades **and a flight of talent and ideas overseas**. There is a silver lining in that brain drain, though, he believes, in that U.S. companies getting back into the game now are less tied to the traditional, giant plants and are freer to innovate. A feature that several of the new product designs share is that the power plants could be mass-produced in a factory to minimize cost, using robots to ensure consistency. Also, with less design work for each installation, the time to complete an order would be shortened and some of the capital and other costs associated with long lead times avoided, Sanders said. Another feature he favors is building the plants with a lifetime supply of fuel sealed inside. Shipped loaded with fuel, such reactors could power a small city for 20 years without the host country ever handling it. Once depleted, the entire plant would be packed back up and shipped back to the United States, he said, with the sensitive spent fuel still sealed away inside. Sanders is working on a reactor design hatched by the lab with an undisclosed private partner. He believes it is feasible to build a prototype modular reactor -- including demonstration factory components and a mockup of the reactor itself -- as early as 2014, for less than a billion dollars. A mini-reactor could ring up at less than $200 million, he said, or at $300 million to $400 million with 20 years of fuel. At $3,000 to $4,000 per kilowatt, he said, that would amount to significant savings over estimates of $4,000 to $6,000 per kilowatt for construction alone with traditional plant designs. To get a design ready to build, Sanders is urging a partnership between the government and the private sector. "If it's totally a government research program, labs can take 20 to 30 years" to finish such projects, he said. "If it becomes a research science project, it could go on forever." New approach, old debates So far, **there is no sign that the** government's nuclear gatekeeper, **NRC, is wowed by the small-reactor designs.** NRC's Office of New Reactors warned Babcock & Wilcox in June that the agency "will need to limit interactions with the designers of small power reactors to occasional meetings or other nonresource-intensive activities" over the next two years because of a crowded schedule of work on other proposals. Meanwhile, opponents of nuclear technologies are not convinced that small reactors are an improvement over traditional designs. Arjun Makhijani, who heads the Institute for Energy and Environmental Research, a think tank that advocates against nuclear power, sees disseminating the technology as incompatible with controlling it. "A lot of the proliferation issue is not linked to having or not having plutonium or highly enriched uranium, but who has the expertise to have or make bombs," Makhijani said. "In order to spread nuclear technologies, you have to have the people who have the expertise in nuclear engineering, who know about nuclear materials and chain reactions and things like that -- the same expertise for nuclear bombs. That doesn't suffice for you to make a bomb, but then if you clandestinely acquire the materials, then you can make a bomb." Peter Wilk, acting program director for safe energy with Physicians for Social Responsibility, an anti-nuclear group, argues that expanding nuclear power use runs counter to the goal of nonproliferation. "The whole proposition presupposes an ... international economy in which more and more fuel is produced and more and more waste must be dealt with, which only makes those problems that are still unsolved larger," he said. "It may or may not do a better job of preventing the host country from literally getting their hands on it, but it doesn't reduce the amount of fuel in the world or the amount of waste in the world," Wilk added. And then there is the issue of public opinion. "Imagine that Americans would agree to take the waste that is generated in other countries and deal with it here," Makhijani said. "At the present moment, it should be confined to the level of the fantastic, or even the surreal. If [the technology's backers] could come up with a plan for the waste, then we could talk about export." Makhijani pointed to a widely touted French process for recycling nuclear waste as a red herring (ClimateWire, May 18). "It's a mythology that it ameliorates the waste problem," he said. According to Makhijani's calculations, the French recycling process generates far more radioactive waste than it cleans up. One category of highly radioactive material, which ends up stored in glass "logs" for burial, is reduced, he said. But in processing the waste, about six times the original volume of waste is produced, he said. Much of that must be buried deep underground, and the discharge of contaminated wastewater used in recycling has angered neighboring countries, he said. Operational risk, of course, is another major concern. "One has reduced the amount of unnecessary risk," Wilke said, "but it's still unnecessary risk." He added, "I get the theory that smaller, newer, ought to be safer. The question is: Why pursue this when there are so many better alternatives?" To Sandia's Sanders, Wilke is asking the wrong question. With the governments of major economies like China, Russia and Japan putting support and cash into nuclear technologies, the power plants are here to stay, he believes. "There's going to be a thousand reactors built over the next 50 years," he said. "The question is: Are we building them, or are we just importing them?"

#### Domestic nuclear expansion’s key to leadership and nonprolif

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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.

#### Plan accesses a huge export market

Rosner and Goldberg 11

Robert Rosner, Stephen Goldberg, Energy Policy Institute at Chicago, The Harris School of Public Policy Studies, November 2011, SMALL MODULAR REACTORS –KEY TO FUTURE NUCLEAR POWER GENERATION IN THE U.S., <https://epic.sites.uchicago.edu/sites/epic.uchicago.edu/files/uploads/EPICSMRWhitePaperFinalcopy.pdf>

Previous studies have documented the potential for a significant export market for U.S. SMRs, mainly in lesser developed countries that do not have the demand or infrastructure to accommodate GW-scale LWRs. Clearly, the economics of SMR deployment depends not only on the cost of SMR modules, but also on the substantial upgrades in all facets of infrastructure requirements, particularly in the safety and security areas, that would have to be made, and as exemplified by the ongoing efforts in this direction by the United Arab Emirates (and, in particular, by Abu Dhabi). This is a substantial undertaking for these less developed countries. Thus, such applications may be an attractive market opportunity for FOAK SMR plants, even if the cost of such plants may not have yet achieved all of the learning benefits.

The Department of Commerce has launched the Civil Nuclear Trade Initiative, which seeks to identify the key trade policy challenges and the most significant commercial opportunities. The Initiative encompasses all aspects of the U.S. nuclear industry, and, as part of this effort, the Department identified 27 countries as “markets of interest” for new nuclear expansion. A recent Commerce Department report identified that “SMRs can be a solution for certain markets that have smaller and less robust electricity grids and limited investment capacity.” Studies performed by Argonne National Laboratory suggest that SMRs would appear to be a feasible power option for countries that have grid capacity of 2,000-3,000 MW. **Exports of SMR technology** also **could play an important role in furthering non-proliferation policy objectives.** The design of SMR nuclear fuel management systems, such as encapsulation of the fuel, may have non-proliferation benefits that merit further assessment. Also, the development of an SMR export industry would be step toward a U.S.-centric, bundled reliable fuel services.

## solvency

#### Other Transactions authority leads to effective and quick acquisition

Dix et al 3

Nancy Dix, and Fernard Lavallee, partners in the San Diego and Washington, D.C., offices of Gray Cary, and Kimberly Welch, senior associate, specialize in specialize in government contracts, government contracts litigation, and intellectual property, Fall 2003, FEAR AND LOATHING OF FEDERAL CONTRACTING: ARE COMMERCIAL COMPANIES REALLY AFRAID TO DO BUSINESS WITH THE FEDERAL GOVERNMENT? SHOULD THEY BE?, 33 Pub. Cont. L.J. 5

DARPA has taken the position that OT authority permits tremendous flexibility in the terms and conditions that can be negotiated under such agreements, and, consequently, that there are a great variety of uses for the OT instrument. For example, DARPA has pioneered the use of OTs for research and technology development projects performed as multiparty cooperative arrangements involving cost sharing and advancing dual-use technologies. While the principal purpose of these transactions frequently is like traditional federal assistance, that is, other than to acquire goods and services for the direct benefit and use of the Government, DARPA does take the view that some OTs can be used for acquisition. n62

Proponents of OTs coined the phrase "freedom of contract" to describe the flexibility offered by OTs. Other Transactions are meant to present the Government and contractor with a "blank page" from which to begin when negotiating such instruments. Generally speaking, the terms and conditions of an OT are negotiable; however, DARPA has a well-defined "opening position." DARPA's opening position usually includes, for example, restrictions on foreign access to technology and a Bayh-Dole treatment for patents, without a requirement for the flow-down of the Bayh-Dole provisions.

The "freedom of contract" aspect also acknowledges that OTs are subject to even fewer laws and regulations than Cooperative Agreements or CRADAs. In December 1996, Under Secretary of Defense Paul Kaminski published a memorandum to the secretaries of the military departments and directors of defense agencies that identifies statutes that "are not necessarily applicable to 'other transactions.'" n63

The OT provides both the Government and contractors with unparalleled opportunities to negotiate terms and conditions designed to maintain a contractor's competitive advantage in the commercial marketplace while providing the Government with timely and affordable access to cutting-edge technologies and services. n64 In many respects, the OT is the ultimate in streamlined federal acquisition, allowing the Government to "do business the way business does business." The latitude afforded to the Government by OTs enables the sovereign to attract contractors that traditionally would not, or could not, do business with the Government.

#### SMR’s are super cost-effective and safe

Ioannis N. Kessides and Vladimir Kuznetsov 12, Ioannis is a researcher for the Development Research Group at the World Bank, Vladimir is a consultant for the World Bank, “Small Modular Reactors for Enhancing Energy Security in Developing Countries”, August 14, Sustainability 2012, 4(8), 1806-1832

SMRs offer a number of advantages that can potentially offset the overnight cost penalty that they suffer relative to large reactors. Indeed, several characteristics of their proposed designs can serve to overcome some of the key barriers that have inhibited the growth of nuclear power. These characteristics include [23,24]: \* • Reduced construction duration. The smaller size, lower power, and simpler design of SMRs allow for greater modularization, standardization, and factory fabrication of components and modules. Use of factory-fabricated modules simplifies the on-site construction activities and greatly reduces the amount of field work required to assemble the components into an operational plant. As a result, the construction duration of SMRs could be significantly shorter compared to large reactors leading to important economies in the cost of financing. \* • Investment scalability and flexibility. In contrast to conventional large-scale nuclear plants, due to their smaller size and shorter construction lead-times SMRs could be added one at a time in a cluster of modules or in dispersed and remote locations. Thus capacity expansion can be more flexible and adaptive to changing market conditions. The sizing, temporal and spatial flexibility of SMR deployment have important implications for the perceived investment risks (and hence the cost of capital) and financial costs of new nuclear build. Today’s gigawatt-plus reactors require substantial up-front investment—in excess of US$ 4 billion. Given the size of the up-front capital requirements (compared to the total capitalization of most utilities) and length of their construction time, new large-scale nuclear plants could be viewed as “bet the farm” endeavors for most utilities making these investments. SMR total capital investment costs, on the other hand, are an order of magnitude lower—in the hundreds of millions of dollars range as opposed to the billions of dollars range for larger reactors. These smaller investments can be more easily financed, especially in small countries with limited financial resources. SMR deployment with just-in-time incremental capacity additions would normally lead to a more favorable expenditure/cash flow profile relative to a single large reactor with the same aggregate capacity—even if we assume that the total time required to emplace the two alternative infrastructures is the same. This is because when several SMRs are built and deployed sequentially, the early reactors will begin operating and generating revenue while the remaining ones are being constructed. In the case of a large reactor comprising one large block of capacity addition, no revenues are generated until all of the investment expenditures are made. Thus the staggered build of SMRs could minimize the negative cash flow of deployment when compared to emplacing a single large reactor of equivalent power [25]. \* • Better power plant capacity and grid matching. In countries with small and weak grids, the addition of a large power plant (1000 MW(e) or more) can lead to grid stability problems—the general “rule of thumb” is that the unit size of a power plant should not exceed 10 percent of the overall electricity system capacity [11]. The incremental capacity expansion associated with SMR deployment, on the other hand, could help meet increasing power demand while avoiding grid instability problems. \* • Factory fabrication and mass production economies. SMR designs are engineered to be pre-fabricated and mass-produced in factories, rather than built on-site. Factory fabrication of components and modules for shipment and installation in the field with almost Lego-style assembly is generally cheaper than on-site fabrication. Relative to today’s gigawatt-plus reactors, SMRs benefit more from factory fabrication economies because they can have a greater proportion of factory made components. In fact, some SMRs could be manufactured and fully assembled at the factory, and then transported to the deployment site. Moreover, SMRs can benefit from the “economies of multiples” that accrue to mass production of components in a factory with supply-chain management. \* • Learning effects and co-siting economies. Building reactors in a series can lead to significant per-unit cost reductions. This is because the fabrication of many SMR modules on plant assembly lines facilitates the optimization of manufacturing and assembly processes. Lessons learned from the construction of each module can be passed along in the form of productivity gains or other cost savings (e.g., lower labor requirements, shorter and more efficiently organized assembly lines) in successive units (Figure 6). Moreover, additional learning effects can be realized from the construction of successive units on the same site. Thus multi-module clustering could lead to learning curve acceleration. Since more SMRs are deployed for the same amount of aggregate power as a large reactor, these learning effects can potentially play a much more important role for SMRs than for large reactors [26]. Also, sites incorporating multiple modules may require smaller operator and security staffing. \* • Design simplification. Many SMRs offer significant design simplifications relative to large-scale reactors utilizing the same technology. This is accomplished thorough the adoption of certain design features that are specific to smaller reactors. For example, fewer and simpler safety features are needed in SMRs with integral design of the primary circuit (i.e., with an in vessel location of steam generators and no large diameter piping) that effectively eliminates large break LOCA. Clearly one of the main factors negatively affecting the competitiveness of small reactors is economies of scale—SMRs can have substantially higher specific capital costs as compared to large-scale reactors. However, SMRs offer advantages that can potentially offset this size penalty. As it was noted above, SMRs may enjoy significant economic benefits due to shorter construction duration, accelerated learning effects and co-siting economies, temporal and sizing flexibility of deployment, and design simplification. When these factors are properly taken into account, then the fact that smaller reactors have higher specific capital costs due to economies of scale does not necessarily imply that the effective (per unit) capital costs (or the levelized unit electricity cost) for a combination of such reactors will be higher in comparison to a single large nuclear plant of equivalent capacity [22,25]. In a recent study, Mycoff et al. [22] provide a comparative assessment of the capital costs per unit of installed capacity of an SMR-based power station comprising of four 300 MW(e) units that are built sequentially and a single large reactor of 1200 MW(e). They employ a generic mode to quantify the impacts of: (1) economies of scale; (2) multiple units; (3) learning effects; (4) construction schedule; (5) unit timing; and (6) plant design (Figure 7). To estimate the impact of economies of scale, Mycoff et al. [22] assume a scaling factor n = 0.6 and that the two plants are comparable in design and characteristics—i.e., that the single large reactor is scaled down in its entirety to ¼ of its size. According to the standard scaling function, the hypothetical overnight cost (per unit of installed capacity) of the SMR-based power station will be 74 percent higher compared to a single large-scale reactor. Based on various studies in the literature, the authors posit that the combined impact of multiple units and learning effects is a 22 percent reduction in specific capital costs for the SMR-based station. To quantify the impact of construction schedule, the authors assume that the construction times of the large reactor and the SMR units are five and three years respectively. The shorter construction duration results in a 5 percent savings for the SMRs. Temporal flexibility (four sequentially deployed SMRs with the first going into operation at the same time as the large reactor and the rest every 9 months thereafter) and design simplification led to 5 and 15 percent reductions in specific capital costs respectively for the SMRs. When all these factors are combined, the SMR-based station suffers a specific capital cost disadvantage of only 4 percent as compared to the single large reactor of the same capacity. Thus, the economics of SMRs challenges the widely held belief that nuclear reactors are characterized by significant economies of scale [19].

## link uq

#### Incentives inevitable

Jeffrey Tomich 11-2, energy reporter for the St Louis Dispatch, “Ameren, Westinghouse still waiting for decision on nuclear grant”, <http://www.stltoday.com/business/local/ameren-westinghouse-still-waiting-for-decision-on-nuclear-grant/article_1b46d35b-eda4-5c15-9b08-b0ed80caf2bf.html>

It was six months ago that Ameren Missouri and Westinghouse officials joined Gov. Jay Nixon on the lawn of the governor’s mansion to announce plans to pursue a first-of-its-kind mini nuclear reactor that would be built next to the utility’s Callaway plant.

The effort had bipartisan political support. Other Missouri electricity suppliers were on board, as well as the state’s university system. Everything seemed in place — almost.

The whole plan hinged on getting at least a share of a $452 million federal grant to advance commercialization of next-generation nuclear technology.

Today, a month after the Department of Energy was supposed to announce who would share the federal money, Ameren and Westinghouse are still waiting. And with the presidential election just days away, heightened scrutiny of energy technology subsidies, a growing budget deficit and a potential change in administrations are looming.

An Energy Department spokeswoman said applications are still under review. She didn’t say when a decision would be made.

The companies have reason to be anxious. The government has laid out an ambitious timetable for those who share the award. The winning teams are expected to have the next-generation reactors running by 2022, leaving a decade to design, license and build a new breed of nuclear plant.

“The team is kind of counting on that (grant) right now,” Joe Zwetolitz, president of Westinghouse Americas, said Tuesday at a conference for potential suppliers at the Renaissance Grand Hotel in downtown St. Louis. “It’s really necessary to help spur development.”

President Barack Obama announced the availability of grant funding for so-called small nuclear reactors in March during a stop in Columbus, Ohio, as part of his all-of-the-above energy strategy. Two projects will share the $452 million over a five-year span.

The small-scale reactors, generally less than a third the size of today’s plants, have been touted by the nuclear industry as carbon-free sources of around-the-clock electric generation that offer safety benefits and would be easier for utilities to finance and deploy.

That’s only part of the reason the federal government is willing to throw almost half a billion dollars at developing the technology. The Obama administration also sees modular nuclear plants as another piece of an American manufacturing revival — one with potential to generate thousands of jobs building components that can be shipped overseas.

The possibility for jobs is also a big draw for Nixon and other local politicians, especially because Westinghouse has said it would build a manufacturing plant in Missouri if it wins the grant and a market for the mini reactors develops.

The Ameren-Westinghouse team is one of four that applied for the federal grant in May. Other competing ventures include established names, such as Babcock & Wilcox Co., as well as NuScale Power LLC and Holtec International Inc., both relative newcomers.

Nick Cunningham, a policy analyst for the American Security Project, a nonprofit research group, believes the upcoming election may have temporarily derailed an announcement, but he believes it will come eventually since both candidates are on record as supporting advances of nuclear power.

“I think it will move forward next year,” he said.

Westinghouse officials say they’re ready to submit design certification for the small reactor to the Nuclear Regulatory Commission next year. And while Ameren’s timing is less certain, the utility could apply for a construction and operating license as early as 2014.

#### But it’s not enough

DoD Energy Blog, 2/16/11, Good Things in Small Packages:Small Reactors for Military Power Good Things in Small Packages:Small Reactors for Military Power, dodenergy.blogspot.com/2011/02/good-things-in-small-packagessmall.html

They conclude that DOD should lead the charge for small reactors to meet their own needs as well as to make sure that the US leads that industry’s development. When first written the paper mentioned that most of the technology was stymied somewhere between the drawing board and production. But there is good news in the President’s 2011 Budget for nukes. The New York Times reported that the budget contains $500 million over five years for DOE to complete two designs and secure National Regulatory Commission (NRC) approval. The reactors will be built entirely in a factory and trucked to the site, like “modular homes”. Sounds just like what Dr. Andres ordered. **Only problem is that $500 million is only about half of the cost to get to NRC approval. Actual production is in the $2 billion neighborhood**, and that is a pricey neighborhood. Enter Amory Lovins. Amory has often derided the cost for nuclear power as an unnecessary expenditure. His argument is that micropower is the way of the future, not big honking gigawatt nuclear power plants. Although there has been a resurgence in the interest in nuclear power, **it is still difficult to find private investments willing to underwrite the expense**. Maybe the development of small nukes for national security reasons will lead to cost effective small nukes for distributed micropower nationwide. Small reactors for FOBs are more problematic. Even Bagram only needs about 25 MW with other FOBS being smaller. Security will be the first concern. If someone tries a smash and grab at Fort Hood they have to go through a couple of armored divisions and have a long way to got to get away. Kabul to Peshawar is only 128 miles. Cost shouldn’t be an overriding factor in considering secure power, but even at a 75% cost reduction in production, half a billion for 25MW is a bit much. Of course if you could produce a 300MW system, Bagram could air condition Kabul! The real soft power. My buddy, T.C. the fighter pilot, would tell you that DOD's mission is to fight and win the Nation's wars, not spark business recovery. DOD needs to focus on conserving energy. “Reducing the consumption at Miramar by 50% might save a lot of fuel and money, but I'd rather reduce consumption by 50% at PB Jugroom even though the savings in gallons and dollars are tiny.” Reducing demand reduces risk. All that being said, it may well be worth DOE and DOD efforts to explore the potential. It is something that may be beyond the means of commercial entities, but not government (See China). If there is going to be a market here, let us not be left behind as we have been with other alternative energy production means.

# 2AC

## prolif

#### Lasers haven’t been approved

Grossman, Global Security Newswire, 9-25-12

(Elaine, “U.S. Nuclear Agency OKs License for Laser Enrichment, Despite Worries,” http://www.nti.org/gsn/article/us-nuclear-agency-oks-license-laser-enrichment-despite-worries/, accessed 9-29-12)

Led by Chairwoman Allison Macfarlane, the NRC commissioners have not actually voted on whether to approve the GE-Hitachi license, according to McIntyre. Rather, the NRC spokesman said, “the commission was notified verbally that staff was prepared to issue the license, and since the commission did not direct otherwise, the staff proceeded.”

#### There’s no impact and the US isn’t key

Steve Packard 11, member of the James Randi educational foundation – contributor to the Bad Science Blog, “Laser Enrichment: No it doesn’t mean terrorists will have the bomb”, August 23, <http://beforeitsnews.com/environment/2011/08/laser-enrichment-no-it-doesnt-mean-terrorists-will-have-the-bomb-996015.html>

The very notion that there are some kind of special “risks” to building a laser enrichment plant really shows that most of those who are opposing the development of this technology have no idea what it actually does or how it works.

Laser-based isotope enrichment accomplishes exactly the same thing that the existing methods of gaseous diffusion and gas centrifuges do: it increases the concentration of uranium-235 to uranium-238. Each time the process is preformed, it increases the concentration relatively slightly, so it must be done repeatedly, in a so-called “cascade.” If the same material is processed through the cascade a few times, it produces low enrichment uranium, suitable for nuclear power reactors. If it is done many more times, it produces highly enriched uranium, which can be used for weapons.

Both the gas centrifuge and gaseous diffusion utilize the small difference in mass between uranium-235 and uranium-238 to separate the two isotopes and thus provide enriched uranium. Laser enrichment, on the other hand, uses the slightly different absorption of differing frequencies of light. A high power tunable dye laser is tuned to precisely the frequency which tends to excite uranium-235 more than uranium-238. This selectively vaporizes the uranium-235, allowing it to be separated. In most forms of laser enrichment, this is done with a compound like uranium hexafluoride, since it vaporizes at lower energies than pure uranium, although processes for elemental uranium have been experimented with before.

Laser enrichment has been experimented with in the laboratory since the 1960’s and until recently, the high cost of the specialized lasers needed made it uneconomical for anything beyond small experimental setups. However, improvements in the efficiency and economics of lasers have started to change that and now a number of organizations are working to construct laser enrichment facilities. These facilities are expected to be more energy efficient than existing uranium enrichment facilities and may be more economical to run in general.

But, lets keep this in perspective: laser enrichment facilities are still enormous, complex and expensive operations that cost hundreds of millions or billions of dollars. This is not something that can be done with simple diode lasers that an individual can easily acquire. It’s far beyond even the large lasers used for welding and fabrication in factories. These are very precisely built and tuned, very high power laser systems. Powerful copper vapor lasers pump secondary dye lasers. Uranium compounds are vaporized in a vacuum, creating super hot gasses that are highly corrosive and reactive. These are once-again sublimated back to solids so that they can be again vaporized. Multiple-megawatts of laser energy are required along with the supporting equipment to power and cool the lasers and other systems.

Laser enrichment also does not remove the other challenges of fabricating weapons material. The uranium must be highly purified and converted to uranium hexafluoride. After enrichment, it must be defluoridated. The materials involved are highly reactive and special care must be used at all steps of the process. Finally, the uranium must be reduced back to its metallic form before it can go through a final alloying process. Only then is it ready for use in a weapon, which still requires more effort and resources to produce.

This kind of funding and technology is certainly within the capabilities of many nation states, but is far from within the grasp of any individual, small group or terrorist organization.

The US Stands Poised to Make the Same Boneheaded Mistake Twice:

Even as General Electric works to secure approval for the first laser-based enrichment plant in the US, politicians and various activists are working hard to stop it from happening. It seems lost on them that the technology will advance and will be used whether or not the US decides to do so.

Of course, whether the US actually moves forward with laser separation has no baring at all on whether other nations decide to enrich uranium or use it for weapons. Many other countries already do enrich uranium and there’s no reason to think they would pass up the opportunity to improve the economics and efficiency of doing so by turning to laser enrichment as it becomes available, which it will.

## dod

#### We could commercialize SMR’s within 5 years

Freed 10

Josh Freed, Director of the Third Way Clean Energy Program, Elizabeth Horwitz, Policy Advisor at Third Way’s Clean Energy Program, Jeremy Ershow, Third Way Clean Energy Program, Sept 2010, Thinking Small On Nuclear Power, http://content.thirdway.org/publications/340/Third\_Way\_Idea\_Brief\_-\_Thinking\_Small\_On\_Nuclear\_Power.pdf

Several U.S. companies are in the advanced stages of developing small reactors that adapt existing technology to produce smaller amounts of baseload electricity.15 These technologies are nearly ready for deployment. Final decisions about design, siting, and regulatory approval could be made within the next five years.16 The federal government can take several steps to help make this possible. First, economic barriers to entry must be lowered. For first movers, costs of licensing, design and regulatory approval will be comparable to those of the larger reactors because existing regulations have not yet been tailored to suit new designs. As the Nuclear Regulatory Commission (NRC) gains expertise in evaluating SMRs, and as economies of scale develop, these costs will decrease. Until this happens, the Department of Energy’s new cost-sharing program for near-term licensing and deployment of light water SMRs will help reduce some of the financial impact.17[i] The NRC also needs to continue its commitment to allocate sufficient resources and build the expertise necessary to evaluate and license SMRs in a timely fashion. The Department of Energy (DOE) and Department of Defense (DOD) can also prime the market pump by serving as a buyer of first-of-a-kind technologies. This could include deploying SMRs on DOE-owned sites, many of which are already zoned to support nuclear power plants,18 and appropriate DOD facilities in the United States. DOD, the largest single energy consumer in the U.S., comprises 78% of federal energy use, and is the most significant energy consumer in several metropolitan areas.19 DOE should also work closely with the private sector to develop standardized designs, with the goal of achieving demonstration and licensing within a decade.20 The potential market for SMRs is global. As we note in “Getting Our Share of Clean Energy Trade,” whichever country emerges as the market leader could dominate a good part of the $6 trillion global energy market.21 The U.S. could seize that mantle and all the jobs and exports that come with it. American reactors could be deployed within a decade domestically22 and go global soon after.

## squo solves

#### Only smr’s solve the grid – renewables fail

Charles Barton 11, founder of the Nuclear Green Revolution blog, MA in philosophy, “Future storm damage to the grid may carry unacceptable costs”, April 30, <http://nucleargreen.blogspot.com/2011_04_01_archive.html>

Amory Lovins has long argued that the traditional grid is vulnerable to this sort of damage. Lovins proposed a paradigm shift from centralized to distributed generation and from fossil fuels and nuclear power to renewable based micro-generation. Critics have pointed to flaws in Lovins model. Renewable generation systems are unreliable and their output varies from locality to locality, as well as from day to day, and hour to hour. In order to bring greater stability and predictability to the grid, electrical engineers have proposed expanding the electrical transmission system with thousands of new miles of transmission cables to be added to bring electricity from high wind and high sunshine areas, to consumers. This would lead, if anything, to greater grid vulnerability to storm damage in a high renewable penetration situation. Thus Lovins renewables/distributed generation model breaks down in the face of renewables limitations. Renewables penetration, will increase the distance between electrical generation facilities and customer homes and businesses, increasing the grid vulnerable to large scale damage, rather than enhancing reliability. Unfortunately Lovins failed to note that the distributed generation model actually worked much better with small nuclear power plants than with renewable generated electricity. Small nuclear plants could be located much closer to customer's homes, decreasing the probability of storm damage to transmission lines. At the very worst, small NPPs would stop the slide toward increased grid expansion. Small reactors have been proposed as electrical sources for isolated communities that are too remote for grid hookups. If the cost of small reactors can be lowered sufficiently it might be possible for many and perhaps even most communities to unhook from the grid while maintaining a reliable electrical supply. It is likely that electrical power will play an even more central role in a post-carbon energy era. Increased electrical dependency requires increased electrical reliability, and grid vulnerabilities limit electrical reliability. Storm damage can disrupt electrical service for days and even weeks. In a future, electricity dependent economy, grid damage can actually impede storm recovery efforts, making large scale grid damage semi-self perpetuating. Such grid unreliability becomes a threat to public health and safety. Thus grid reliability will be a more pressing future issue, than it has been. It is clear that renewable energy sources will worsen grid reliability, Some renewable advocates have suggested that the so called "smart grid" will prevent grid outages. Yet the grid will never be smart enough to repair its own damaged power lines. In addition the "smart grid" will be venerable to hackers, and would be a handy target to statures. A smart grid would be an easy target for a Stuxnet type virus attack. Not only does the "smart grid" not solve the problem posed by grid vulnerability to storm damage, but efficiency, another energy approach thought to be a panacea for electrical supply problems would be equally useless. Thus, decentralized electrical generation through the use of small nuclear power plants offers real potential for increasing electrical reliability, but successful use of renewable electrical generation approaches may worsen rather than improved grid reliability.

#### Renewables fail

Daveed Gartenstein-Ross 12, senior fellow at the Foundation for Defense of Democracies, “Powering Guantánamo”, August 2, <http://gunpowderandlead.org/2012/08/powering-guantanamo/>

The Naval Station Guantánamo Bay is separate from JTF-GTMO (the latter being responsible for detentions). However, it faces some issues that other overseas bases simply do not. First and foremost, it is the only naval station located in a country with which the U.S. does not have diplomatic relations. As the U.S.’s oldest overseas base, the country has been making use of this territory since February 1903, when it first leased 45 square miles of land to use as a coaling station. In 1934, a treaty between the U.S. and Cuba affirmed the lease agreement, with the stipulation that the lease could not be terminated unless the U.S. and Cuba both agreed to it, or the U.S. abandoned the base. International agreements do not simply expire following revolutions, and hence the U.S. legally maintained its base at Guantánamo Bay even after the Fidel Castro-led revolution. However, in February 1964 Castro cut off water and other avenues of supply to the base, which forced it to be self-sustaining. It has been self-sustaining for more than forty years, generating its own power and — as of 2012 — desalinating about 1.2 million gallons of water per day. Before “war on terror” detainees were moved to Gitmo, the base was almost in a caretaker status. That is, enough people were kept on the base to keep it going, but no money was put into maintaining buildings that were unlikely to be used again. So when JTF-GTMO began, the base was not fully manned: instead, the basic functions included guarding the perimeter, refueling ships coming through, and upkeep of the base. Most of the prominent base facilities — including the Starbucks and McDonald’s that Today’s Zaman specifically noted — are recent additions, specifically created to serve the needs that arose after JTF-GTMO’s establishment.”The JTF was created and suddenly you had a lot more people here, and that created the need to build up the base,” Nettleton told me. “All of a sudden you had a doubling of our base population. You had to feed them, clothe them, build new buildings.” Today there are over 5,400 personnel at the Naval Station Guantánamo Bay, including about 2,435 military and 2,965 civilians (of whom about 1,570 military and 320 civilian personnel are attached to the JTF). Because the base has to be self-sustaining — and because food, supplies, building materials, etc. have to be brought in from elsewhere — that significantly increases costs at the naval station. One thing that I found particularly interesting is that a large percentage of the base’s electrical power comes from liquid fuels. Costs are not just related to the expense of the fuels themselves, but also the expense of bringing them to the naval station in the first place. Given the military’s push for green energy, I wondered if this might be an area where the base could save money in the long term. To be clear, one of the very prominent features of the Guantánamo naval station is four windmills atop one of the hills (only three of which are functioning at present). However, only 2-3% of the base’s electricity on any given day is generated by the windmills. Based on the sheer amount of sunlight it experiences, Guantánamo Bay also seems like it could be an ideal place to harness solar energy. And indeed, the base features a small solar field that is set inside an old high school running track that is no longer in use. But like the windmills, this solar field does not make a significant dent in the base’s overall electricity consumption.

#### Microgrids aren’t widespread and no funding for them

Daniel Sater, 2011, Research Fellow at Global Green USA's Security and Sustainability Office, Military Energy Security: Current Efforts and Future Solutions, Global Green, globalgreen.org/docs/publication-185-1.pdf

In the first six months of 2011, the US civilian power grid suffered 155 blackouts affecting an average of 83,000 people with 36 blackouts affecting over 100,000 people.1 Despite these staggering numbers, US military bases rely solely on the civilian grid to power 99% of their war fighting capabilities, homeland security missions, and rescue and relief operations.2 This paper analyzes the Department of Defense’s current efforts to increase energy efficiency and assurance and makes recommendations on the policy options available to the DOD to increase the incorporation of smart microgrids onto its military installations.

A Microgrid is a small localized version of the Smart Grid. It increases energy efficiency by regulating demand and allows for better incorporation of renewable energy sources. During a power outage, a microgrid will disconnect itself from the civilian power grid and turn on an installation’s generators to ensure electricity availability to a base’s critical loads. By prioritizing loads during an emergency, a microgrid will drastically decrease the need for fuel resupplies during a civilian power grid failure. Microgrids also have the potential for deployment in war zones where power supplies are even less secure.

Despite the benefits of microgrids, the DOD, as well as legislation and executive orders, has focused on less efficient energy alternatives. The Environmental Conservation Investment Program, one of the principle funding mechanisms to fund conservation efforts in the DOD, rarely invests in microgrids and focuses too much on less cost efficient projects. Further, the DOD’s Net Zero Energy Installation Initiative does little to increase energy assurance at military installations. By focusing too much on renewable energy generation, legislation and executive orders have decreased the available funds for microgrids, which if installed before a renewable energy project, can increase its viability.

The Defense Science Board (DSB) has published two reports urging the DOD to decrease its energy costs and better secure its energy supply to bases. However, the development of microgrids, despite their cost effectiveness and impact on energy assurance, remains slow and infrequent. To increase national security and decrease the department’s energy expenditures, the DOD should enact changes to its investment programs to give more consideration to microgrids and pursue special appropriations from Congress for the widespread deployment of microgrids. The benefit of this two-pronged approach is that it allows the DOD to follow a short-term zero cost solution while it waits for the necessary appropriation from Congress to solve the Defense Department’s energy problems.

## topicality

#### Financial incentives induce production using cash – that includes power purchasing

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

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

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

#### Precision – our definition’s from the DoE

Waxman 98 **–** Solicitor General of the US (Seth, Brief for the United States in Opposition for the US Supreme Court case HARBERT/LUMMUS AGRIFUELS PROJECTS, ET AL., PETITIONERS v. UNITED STATES OF AMERICA, http://www.justice.gov/osg/briefs/1998/0responses/98-0697.resp.opp.pdf)

2 On November 15, 1986, Keefe was delegated “the authority, with respect to actions valued at $50 million or less, to approve, execute, enter into, modify, administer, closeout, terminate and take any other necessary and appropriate action (collectively, ‘Actions’) with respect to Financial Incentive awards.” Pet. App. 68, 111-112. Citing DOE Order No. 5700.5 (Jan. 12, 1981), the delegation defines “Financial Incentives” as the authorized financial incentive programs of DOE, “including direct loans, loan guarantees, purchase agreements, price supports, guaranteed market agreements and any others which may evolve.” The delegation proceeds to state, “[h]owever, a separate prior written approval of any such action must be given by or concurred in by Keefe to accompany the action.” The delegation also states that its exercise “shall be governed by the rules and regulations of [DOE] and policies and procedures prescribed by the Secretary or his delegate(s).” Pet. App. 111-113.

## production k

**The status quo is structurally improving**

Indur **Goklany 10**, policy analyst for the Department of the Interior – phd from MSU, “Population, Consumption, Carbon Emissions, and Human Well-Being in the Age of Industrialization (Part III — Have Higher US Population, Consumption, and Newer Technologies Reduced Well-Being?)”, April 24, <http://www.masterresource.org/2010/04/population-consumption-carbon-emissions-and-human-well-being-in-the-age-of-industrialization-part-iii-have-higher-us-population-consumption-and-newer-technologies-reduced-well-being/#more-9194>

In my previous post I showed that, notwithstanding the Neo-Malthusian worldview, human well-being has advanced globally since the start of industrialization more than two centuries ago, despite massive increases in population, consumption, affluence, and carbon dioxide emissions. In this post, I will focus on long-term trends in the U.S. for these and other indicators. Figure 1 shows that despite several-fold increases in the use of metals and synthetic organic chemicals, and emissions of CO2 stoked by increasing populations and affluence, life expectancy, the single best measure of human well-being, increased from 1900 to 2006 for the US. Figure 1 reiterates this point with respect to materials use. These figures indicate that since 1900, U.S. population has quadrupled, affluence has septupled, their product (GDP) has increased 30-fold, synthetic organic chemical use has increased 85-fold, metals use 14-fold, material use 25-fold, and CO2 emissions 8-fold. Yet life expectancy advanced from 47 to 78 years. Figure 2 shows that during the same period, 1900–2006, emissions of air pollution, represented by sulfur dioxide, waxed and waned. Food and water got safer, as indicated by the virtual elimination of deaths from gastrointestinal (GI) diseases between 1900 and 1970. Cropland, a measure of habitat converted to human uses — the single most important pressure on species, ecosystems, and biodiversity — was more or less unchanged from 1910 onward despite the increase in food demand. For the most part, life expectancy grew more or less steadily for the U.S., except for a brief plunge at the end of the First World War accentuated by the 1918-20 Spanish flu epidemic. As in the rest of the world, today’s U.S. population not only lives longer, it is also healthier. The disability rate for seniors declined 28 percent between 1982 and 2004/2005 and, despite quantum improvements in diagnostic tools, major diseases (e.g., cancer, and heart and respiratory diseases) now occur 8–11 years later than a century ago. Consistent with this, data for New York City indicate that — despite a population increase from 80,000 in 1800 to 3.4 million in 1900 and 8.0 million in 2000 and any associated increases in economic product, and chemical, fossil fuel and material use that, no doubt, occurred —crude mortality rates have declined more or less steadily since the 1860s (again except for the flu epidemic). Figures 3 and 4 show, once again, that whatever health-related problems accompanied economic development, technological change, material, chemical and fossil fuel consumption, and population growth, they were overwhelmed by the health-related benefits associated with industrialization and modern economic growth. This does not mean that fossil fuel, chemical and material consumption have zero impact, but it means that overall benefits have markedly outweighed costs. The reductions in rates of deaths and diseases since at least 1900 in the US, despite increased population, energy, and material and chemical use, belie the Neo-Malthusian worldview. The improvements in the human condition can be ascribed to broad dissemination (through education, public health systems, trade and commerce) of numerous new and improved technologies in agriculture, health and medicine supplemented through various ingenious advances in communications, information technology and other energy powered technologies (see here for additional details). The continual increase in life expectancy accompanied by the decline in disease during this period (as shown by Figure 2) indicates that the new technologies reduced risks by a greater amount than any risks that they may have created or exacerbated due to pollutants associated with greater consumption of materials, chemicals and energy, And this is one reason why the Neo-Malthusian vision comes up short. It dwells on the increases in risk that new technologies may create or aggravate but overlooks the larger — and usually more certain — risks that they would also eliminate or reduce. In other words, it focuses on the pixels, but misses the larger picture, despite pretensions to a holistic worldview.

#### Nuclear technocracy’s key to solve

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

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

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

## renewables da

#### Expansion now

Westenhaus 9/30/12

Brian, editor of the popular energy technology site New Energy and Fuel, “Confidence in Nuclear Power is on the Rise Again,” <http://oilprice.com/Alternative-Energy/Nuclear-Power/Confidence-in-Nuclear-Power-is-on-the-Rise-Again.html>, AM

The U.S. is not alone. New nuclear plants are coming in Asia and even in Europe. Nuclear generating capacity is projected to grow 38% in the next eight years. These kinds of numbers wake up the uranium commodities speculators – even while the market is in the doldrums.

That means we solve warming better

Michael Shellenberger 12, founder of the Breakthrough Institute, graduate of Earlham College and holds a masters degree in cultural anthropology from the University of California, Santa Cruz, "New Nukes: Why We Need Radical Innovation to Make New Nuclear Energy Cheap", September 11, http://thebreakthrough.org/index.php/programs/energy-and-climate/new-nukes/

Arguably, the biggest impact of Fukushima on the nuclear debate, ironically, has been to force a growing number of pro-nuclear environmentalists out of the closet, including us. The reaction to the accident by anti-nuclear campaigners and many Western publics put a fine point on the gross misperception of risk that informs so much anti-nuclear fear. Nuclear remains the only proven technology capable of reliably generating zero-carbon energy at a scale that can have any impact on global warming. Climate change -- and, for that matter, the enormous present-day health risks associated with burning coal, oil, and gas -- simply dwarf any legitimate risk associated with the operation of nuclear power plants. About 100,000 people die every year due to exposure to air pollutants from the burning of coal. By contrast, about 4,000 people have died from nuclear energy -- ever -- almost entirely due to Chernobyl. But rather than simply lecturing our fellow environmentalists about their misplaced priorities, and how profoundly inadequate present-day renewables are as substitutes for fossil energy, we would do better to take seriously the real obstacles standing in the way of a serious nuclear renaissance. Many of these obstacles have nothing to do with the fear-mongering of the anti-nuclear movement or, for that matter, the regulatory hurdles imposed by the U.S. Nuclear Regulatory Commission and similar agencies around the world. As long as nuclear technology is characterized by enormous upfront capital costs, it is likely to remain just a hedge against overdependence on lower-cost coal and gas, not the wholesale replacement it needs to be to make a serious dent in climate change. Developing countries need large plants capable of bringing large amounts of new power to their fast-growing economies. But they also need power to be cheap. So long as coal remains the cheapest source of electricity in the developing world, it is likely to remain king. The most worrying threat to the future of nuclear isn't the political fallout from Fukushima -- it's economic reality. Even as new nuclear plants are built in the developing world, old plants are being retired in the developed world. For example, Germany's plan to phase-out nuclear simply relies on allowing existing plants to be shut down when they reach the ends of their lifetime. Given the size and cost of new conventional plants today, those plants are unlikely to be replaced with new ones. As such, the combined political and economic constraints associated with current nuclear energy technologies mean that nuclear energy's share of global energy generation is unlikely to grow in the coming decades, as global energy demand is likely to increase faster than new plants can be deployed. To move the needle on nuclear energy to the point that it might actually be capable of displacing fossil fuels, we'll need new nuclear technologies that are cheaper and smaller. Today, there are a range of nascent, smaller nuclear power plant designs, some of them modifications of the current light-water reactor technologies used on submarines, and others, like thorium fuel and fast breeder reactors, which are based on entirely different nuclear fission technologies. Smaller, modular reactors can be built much faster and cheaper than traditional large-scale nuclear power plants. Next-generation nuclear reactors are designed to be incapable of melting down, produce drastically less radioactive waste, make it very difficult or impossible to produce weapons grade material, use less water, and require less maintenance. Most of these designs still face substantial technical hurdles before they will be ready for commercial demonstration. That means a great deal of research and innovation will be necessary to make these next generation plants viable and capable of displacing coal and gas. The United States could be a leader on developing these technologies, but unfortunately U.S. nuclear policy remains mostly stuck in the past. Rather than creating new solutions, efforts to restart the U.S. nuclear industry have mostly focused on encouraging utilities to build the next generation of large, light-water reactors with loan guarantees and various other subsidies and regulatory fixes. With a few exceptions, this is largely true elsewhere around the world as well. Nuclear has enjoyed bipartisan support in Congress for more than 60 years, but the enthusiasm is running out. The Obama administration deserves credit for authorizing funding for two small modular reactors, which will be built at the Savannah River site in South Carolina. But a much more sweeping reform of U.S. nuclear energy policy is required. At present, the Nuclear Regulatory Commission has little institutional knowledge of anything other than light-water reactors and virtually no capability to review or regulate alternative designs. This affects nuclear innovation in other countries as well, since the NRC remains, despite its many critics, the global gold standard for thorough regulation of nuclear energy. Most other countries follow the NRC's lead when it comes to establishing new technical and operational standards for the design, construction, and operation of nuclear plants. What's needed now is a new national commitment to the development, testing, demonstration, and early stage commercialization of a broad range of new nuclear technologies -- from much smaller light-water reactors to next generation ones -- in search of a few designs that can be mass produced and deployed at a significantly lower cost than current designs. This will require both greater public support for nuclear innovation and an entirely different regulatory framework to review and approve new commercial designs. In the meantime, developing countries will continue to build traditional, large nuclear power plants. But time is of the essence. With the lion's share of future carbon emissions coming from those emerging economic powerhouses, the need to develop smaller and cheaper designs that can scale faster is all the more important. A true nuclear renaissance can't happen overnight. And it won't happen so long as large and expensive light-water reactors remain our only option. But in the end, there is no credible path to mitigating climate change without a massive global expansion of nuclear energy. If you care about climate change, nothing is more important than developing the nuclear technologies we will need to get that job done.

#### Renewables are collapsing

Jeffrey Ball, Scholar in Residence at Stanford University's Steyer-Taylor Center for Energy Policy and Finance, 12 [“Tough Love for Renewable Energy,” Foreign Affairs, May/June, http://www.foreignaffairs.com/articles/137519/jeffrey-ball/tough-love-for-renewable-energy?page=6]

Over the past decade, governments around the world threw money at renewable power. Private investors followed, hoping to cash in on what looked like an imminent epic shift in the way the world produced electricity. It all seemed intoxicating and revolutionary: a way to boost jobs, temper fossil-fuel prices, and curb global warming, while minting new fortunes in the process.¶ Much of that enthusiasm has now fizzled. Natural gas prices have plummeted in the United States, the result of technology that has unlocked vast supplies of a fuel that is cleaner than coal. The global recession has nudged global warming far down the political agenda and led cash-strapped countries to yank back renewable-energy subsidies. And some big government bets on renewable power have gone bad, most spectacularly the bet on Solyndra, the California solar-panel maker that received a $535 million loan guarantee from the U.S. Department of Energy before going bankrupt last fall.

Existing carbon triggers the impact

Daniel **Rirdan 12**, founder of The Exploration Company, “The Right Carbon Concentration Target”, June 29, <http://theenergycollective.com/daniel-rirdan/89066/what-should-be-our-carbon-concentration-target-and-forget-politics?utm_source=feedburner&utm_medium=feed&utm_campaign=The+Energy+Collective+%28all+posts%29>

James Hansen and other promi­nent cli­ma­tol­o­gists are call­ing to bring the CO2 atmos­pheric level to 350 parts per million. In fact, an orga­ni­za­tion, 350.org, came around that ral­ly­ing cry. This is far more radical than most politicians are willing to entertain. And it is not likely to be enough. The 350ppm target will not reverse the clock as far back as one may assume. It was in 1988 that we have had these level of car­bon con­cen­tra­tion in the air. But wait, there is more to the story. 1988-levels of CO2 with 2012-levels of all other green­house gases bring us to a state of affairs equiv­a­lent to that around 1994 (2.28 w/m2). And then there are aerosols. There is good news and bad news about them. The good news is that as long as we keep spewing mas­sive amounts of particulate matter and soot into the air, more of the sun’s rays are scattered back to space, over­all the reflec­tiv­ity of clouds increases, and other effects on clouds whose over­all net effect is to cool­ing of the Earth sur­face. The bad news is that once we stop polluting, stop run­ning all the diesel engines and the coal plants of the world, and the soot finally settles down, the real state of affairs will be unveiled within weeks. Once we fur­ther get rid of the aerosols and black car­bon on snow, we may be very well be worse off than what we have had around 2011 (a pos­si­ble addi­tion of 1.2 w/m2). Thus, it is not good enough to stop all green­house gas emis­sions. In fact, it is not even close to being good enough. A carbon-neutral econ­omy at this late stage is an unmit­i­gated disaster. There is a need for a carbon-negative economy. Essentially, it means that we have not only to stop emitting, to the tech­no­log­i­cal extent pos­si­ble, all green­house gases, but also capture much of the crap we have already out­gassed and lock it down. And once we do the above, the ocean will burp its excess gas, which has come from fos­sil fuels in the first place. So we will have to draw down and lock up that carbon, too. We have taken fos­sil fuel and released its con­tent; now we have to do it in reverse—hundreds of bil­lions of tons of that stuff.

## at: econ impact

#### Trillion dolla coin solves

Paul Krugman, 1/7/13, Be Ready To Mint That Coin, krugman.blogs.nytimes.com/2013/01/07/be-ready-to-mint-that-coin/

Should President Obama be willing to print a $1 trillion platinum coin if Republicans try to force America into default? Yes, absolutely. He will, after all, be faced with a choice between two alternatives: one that’s silly but benign, the other that’s equally silly but both vile and disastrous. The decision should be obvious. For those new to this, here’s the story. First of all, we have the weird and destructive institution of the debt ceiling; this lets Congress approve tax and spending bills that imply a large budget deficit — tax and spending bills the president is legally required to implement — and then lets Congress refuse to grant the president authority to borrow, preventing him from carrying out his legal duties and provoking a possibly catastrophic default. And Republicans are openly threatening to use that potential for catastrophe to blackmail the president into implementing policies they can’t pass through normal constitutional processes. Enter the platinum coin. There’s a legal loophole allowing the Treasury to mint platinum coins in any denomination the secretary chooses. Yes, it was intended to allow commemorative collector’s items — but that’s not what the letter of the law says. And by minting a $1 trillion coin, then depositing it at the Fed, the Treasury could acquire enough cash to sidestep the debt ceiling — while doing no economic harm at all. So why not? It’s easy to make sententious remarks to the effect that we shouldn’t look for gimmicks, we should sit down like serious people and deal with our problems realistically. That may sound reasonable — if you’ve been living in a cave for the past four years.Given the realities of our political situation, and in particular the mixture of ruthlessness and craziness that now characterizes House Republicans, it’s just ridiculous — far more ridiculous than the notion of the coin. So if the 14th amendment solution — simply declaring that the debt ceiling is unconstitutional — isn’t workable, go with the coin.

## debt ceiling

#### Obama losing capital means the GOP gets everything they want in debt ceiling fights

Reid Epstein, Politico, 1/1/13, Why Obama, McConnell took the deal, dyn.politico.com/printstory.cfm?uuid=83BFDC45-14B4-4B66-B620-D4A21AEEBAE1

But it’s McConnell and the Senate Republicans who strayed from the usual script — all in the hopes of winning the next big battle.

By delaying the sequester cuts for two months, McConnell’s forced them to coincide with the debt ceiling fight. By then, the president won’t have expiring tax cuts or the end-of-the-year media attention to hold over Republicans, and without that — especially after striking a deal and accepting the president’s position on taxes — McConnell will be able to control the coming conversation on spending cuts and overhauling entitlements. Obama got his New Year’s victory, goes the thinking, but now McConnell will be in charge for the rest of 2013.

“This is Obama’s high point in the second term,” said Grover Norquist, the patron saint of refusing to raise taxes. “The next four years are the Republicans … chipping away at his spending, and that’s a fight where independents side with the Rs on a regular basis.”

#### That means Obama folds—avoids sequester and debt ceiling impacts

Brian Beutler, 12/31/12, Dems’ Mystifying New Fiscal Cliff Strategy, talkingpointsmemo.com/archives/2012/12/dems\_mystifying\_new\_fiscal\_cliff\_strategy.php

And it calls into question Obama’s insistence that he’ll refuse to negotiate a debt limit increase early next year. Under the GOP’s most recent offer, the sequester will still be largely intact. And having agreed to compromise on the one thing he was supposed to get for free, Obama will be left to choose between two basically identical, but losing propositions: cut a skewed deal with Republicans to raise the debt limit; or “refuse” to negotiate over the debt limit, but reach the same endpoint in order to defuse the sequester.

#### Obama couldn’t influence negotiations if he wanted to—he has zero leverage and will always fold to avoid the debt ceiling

Howard Kurtz, Daily Beast, 1/1/13, Obama Fiscal Cliff Victory Could Invite Years of Warfare With the GOP, www.thedailybeast.com/articles/2013/01/01/obama-fiscal-cliff-victory-could-invite-years-of-warfare-with-the-gop.print.html

Obama also signaled that when push comes to shove, when the final deadline is at hand, he will retreat from his line-in-the-sand position, although the White House would call it reasonable compromise that spared most people a nasty tax hike.

Still, this was his moment of greatest political leverage. And now that the messy and embarrassing slog over the tax issue has been resolved, the playing field will be more favorable to Republicans in 2013. The administration has little left to trade now that the debate will focus on the $110 billion in automatic spending cuts that Tuesday’s voting delayed for two months.

Even more troublesome, from the White House point of view, is that Republicans can again play the debt ceiling card, as they did in the summer of 2011. The threat of a government default in late February will bring enormous pressure on the president to reach an accommodation on spending cuts, just as the fiscal cliff essentially forced the Republicans to sacrifice wealthier taxpayers to avoid blame for higher levies on 98 percent of Americans.

After the House vote, Obama served notice that he does not want to be drawn into another game of fiscal chicken over the debt ceiling. "While I will negotiate over many things," he said, "I will not have another debate with this Congress over whether or not they should pay the bills that they’ve already racked up through the laws that they passed."

That, at least, is his stated position. But it is hard to imagine the Democrats sticking to that stance if the government’s ability to borrow is on the line. The political approach of blaming the GOP for a default might be tempting, but Obama would share responsibility for a credit downgrade that could rattle the markets and likely push the country into recession.

#### Hagel nomination triggers the DA

Stirewalt, writer for Fox News, 1/7/2013

(Chris, “Obama Antagonizes with Hagel Pick,” http://www.foxnews.com/politics/2013/01/07/obama-antagonizes-with-hagel-pick/#ixzz2HIw1d0GW)

With Republicans still resentful of Hagel’s ostentatious opposition of Bush-era policies and support for Obama’s two presidential runs, confirmation would have been tricky enough. But the queasy feelings of pro-Israel Democrats on the tough-talking Vietnam vet will make it so much worse. Maryland Sen. Ben Cardin, a dutiful Democrat if ever there was one, told the soon-to-be-former cable news network Current TV on Sunday that there are “some statements that [Hagel] needs to clarify” and called the nomination “controversial.” Coming from Cardin, ranked in the 10 most liberal senators by National Journal, that’s the equivalent of a cannon shot across Obama’s bow. **It will take lots of time and effort to drag Hagel**, **opinionated and confrontational**, **across the finish line**. **The president can get it done**, **but the ordeal will be frightful and expend plenty of political capital**. The president is already staring down a double-barreled battle over government spending on the debt ceiling and the expiry of the law funding the government in lieu of a budget. Plus, Obama’s pick to lead the CIA, counterterrorism chief John Brennan, will face plenty of thorny questions from the left about his role in “enhanced interrogation techniques” and from the right about the Islamist raid on the U.S. consulate in Benghazi, Libya.

#### SMRs are popular

Nelson and Northey ‘12

Gabriel and Northey, energy and environment reports for Greenwire, “DOE funding for small reactors languishes as parties clash on debt,” <http://www.eenews.net/public/Greenwire/2012/09/24/3>, AM

It's not just wind and solar projects that are waiting for federal help as Congress duels over the importance of putting taxpayer dollars on the line for cutting-edge energy projects. Some of the nation's largest nuclear power companies are anxious to hear whether they will get a share of a $452 million pot from the Department of Energy for a new breed of reactors that the industry has labeled as a way to lessen the safety risks and construction costs of new nuclear power plants. The grant program for these "small modular reactors," which was announced in January, would mark the official start of a major U.S. foray into the technology even as rising construction costs -- especially when compared to natural-gas-burning plants -- cause many power companies to shy away from nuclear plants. DOE received four bids before the May 21 deadline from veteran reactor designers Westinghouse Electric Co. and Babcock & Wilcox Co., as well as relative newcomers Holtec International Inc. and NuScale Power LLC. Now the summer has ended with no announcement from DOE, even though the agency said it would name the winners two months ago. As the self-imposed deadline passed, companies started hearing murmurs that a decision could come in September, or perhaps at the end of the year. To observers within the industry, it seems that election-year calculations may have sidelined the contest. "The rumors are a'flying," said Paul Genoa, director of policy development at the Nuclear Energy Institute, in an interview last week. "All we can imagine is that this is now caught up in politics, and the campaign has to decide whether these things are good for them to announce, and how." Small modular reactors do not seem to be lacking in political support. The nuclear lobby has historically courted both Democrats and Republicans and still sees itself as being in a strong position with key appropriators on both sides of the aisle. Likewise, top energy officials in the Obama administration have hailed the promise of the new reactors, and they haven't shown any signs of a change of heart. DOE spokeswoman Jen Stutsman said last week that the department is still reviewing applications, but she did not say when a decision will be made.

#### Presidential leadership’s irrelevant

**Jacobs and King 10**, University of Minnesota, Nuffield College, (Lawrence and Desmond, “Varieties of Obamaism: Structure, Agency, and the Obama Presidency,” Perspectives on Politics (2010), 8: 793-802)

But personality is not a solid foundation for a persuasive explanation of presidential impact and the shortfalls or accomplishments of Obama's presidency. Modern presidents have brought divergent individual traits to their jobs and yet they have routinely failed to enact much of their agendas. Preeminent policy goals of Bill Clinton (health reform) and George W. Bush (Social Security privatization) met the same fate, though these presidents' personalities vary widely. And presidents like Jimmy Carter—whose personality traits have been criticized as ill-suited for effective leadership—enjoyed comparable or stronger success in Congress than presidents lauded for their personal knack for leadership—from Lyndon Johnson to Ronald Reagan.7 Indeed, a personalistic account provides little leverage for explaining the disparities in Obama's record—for example why he succeeded legislatively in restructuring health care and higher education, failed in other areas, and often accommodated stakeholders. Decades of rigorous research find that impersonal, structural forces offer the most compelling explanations for presidential impact.8 Quantitative research that compares legislative success and presidential personality finds no overall relationship.9 In his magisterial qualitative and historical study, Stephen Skowronek reveals that institutional dynamics and ideological commitments structure presidential choice and success in ways that trump the personal predilections of individual presidents.10 Findings point to the predominant influence on presidential legislative success of the ideological and partisan composition of Congress, entrenched interests, identities, and institutional design, and a constitutional order that invites multiple and competing lines of authority. The widespread presumption, then, that Obama's personal traits or leadership style account for the obstacles to his policy proposals is called into question by a generation of scholarship on the presidency. Indeed, the presumption is not simply problematic analytically, but practically as well. For the misdiagnosis of the source of presidential weakness may, paradoxically, induce failure by distracting the White House from strategies and tactics where presidents can make a difference. Following a meeting with Obama shortly after Brown's win, one Democratic senator lamented the White House's delusion that a presidential sales pitch will pass health reform—“Just declaring that he's still for it doesn't mean that it comes off life support.”11 Although Obama's re-engagement after the Brown victory did contribute to restarting reform, the senator's comment points to the importance of ideological and partisan coalitions in Congress, organizational combat, institutional roadblocks, and anticipated voter reactions. Presidential sales pitches go only so far.

## hezbollah

#### Caribbean security key to balance Hezbollah

Senator Charles E. Grassley 12, senate caucus on international narcotics control, “us-caribbean security cooperation”, february 1, <http://drugcaucus.senate.gov/hearing-2-1-12/Opening%20Statement%20of%20Senator%20Grassley.pdf>

This issue is particularly important because of the growing ties between Iran and Venezuela. Just yesterday, the Director of National Intelligence testified about Iran’s desire to attack the United States on our own soil, as demonstrated by the recently uncovered plot to target the Saudi Ambassador to the United States in a bomb attack on a Georgetown restaurant, just a few miles from where we’re now sitting. And we know that the Iranian-sponsored terrorist group Hezbollah is increasing its presence in South America. Given the known drug transit routes from Venezuela to the Caribbean and Central America, we need to ensure that the growing ties between Venezuela and Iran do not lead to these routes being utilized to move weapons or terrorists as well. More simply put, Venezuela’s involvement in regional drug trafficking, and their ties to a state sponsor of terrorism, threaten to destabilize other nations in the region, including the Caribbean, and should be taken seriously.

#### Hezbollah collapses Mexico

Roger F. Noriega 11, a senior State Department official from 2001 to 2005, is a visiting fellow at AEI and managing director of Vision Americas LLC, “The mounting Hezbollah threat in Latin America”, October 6, <http://www.aei.org/article/foreign-and-defense-policy/regional/latin-america/the-mounting-hezbollah-threat-in-latin-america/>

The immediate US national security concern related to Hezbollah activity in Latin America is Mexico, where the terrorist group has ready access to the US border. Principal Hezbollah activities there include human smuggling and narcotics trafficking. According to recent congressional testimony, “repeated apprehensions by Mexican authorities of human smuggling networks connected to Hezbollah over the past half-decade indicate that this troubling pattern of activity continues unabated.” [27] Hezbollah’s capacity to move operatives across the US border was noted in a 2007 Homeland Security Committee staff report on threats along the border: “Members of Hezbollah, the Lebanon-based terrorist organization, have already entered to the United States across our Southwest border.” [28] In a notable case, Salim Boughader Mucharrafille was sentenced to sixty years in prison in 2008 after being arrested in 2002 by Mexican authorities on charges of organized crime and immigrant smuggling. Mucharrafille, a Mexican of Lebanese descent who owned a small restaurant in Tijuana, Mexico, just south of San Diego, smuggled 200 people, reportedly including Hezbollah supporters, into the United States. [29] A second case involved Mahmoud Youssef Kourani, who pled guilty in 2005 in the United States to providing material support to Hezbollah. Kourani had bribed a Mexican official in Beirut for a visa to travel to Mexico. From there, he crossed the US border and made his way to Dearborn, Michigan, where there is a sizable Lebanese expatriate community, and began raising funds for Hezbollah in Lebanon. Kourani’s brother is Hezbollah’s chief of military operations in southern Lebanon. [30] While there certainly have been no reported cases of Hezbollah smuggling operatives across the border to carry out terrorist attacks in the United States, it is neither “sensationalist” nor “alarmist” to be concerned about it and respond with appropriate policy measures. [31] Hezbollah’s other focus is making common cause with drug trafficking networks in Mexico (and elsewhere in the Americas). For example, in March 2009, current and former US officials told the Washington Times that ties between Hezbollah and Mexican drug cartels have been strengthening over the past few years. According to Michael Braun, a former high-ranking Drug Enforcement Administration official, Hezbollah relies on “the same criminal weapons smugglers, document traffickers and transportation experts as the drug cartels.” [32] According to an internal September 2010 Tucson (Arizona) Police Department memo leaked by an Internet hacker group, law enforcement authorities there are concerned about links between Mexican drug trafficking organizations (DTOs) and Hezbollah. [33] Specifically, they note Hezbollah’s long-established expertise in the use of small improvised explosive devices and car bombs and the dire implications for border security if such expertise and technology was transferred to Mexican DTOs. According to the memo, “Recent events involving the use of VBIEDs [vehicle-borne improvised explosive devices] make a significant change in tactics employed by DTOs and conjure images expected to be seen in the Middle East. While no connection has been made, Hezbollah’s extensive use of VBIEDs raises strong suspicion concerning a possible relation to Mexican DTOs.” Another disturbing development signaling a growing relationship between Hezbollah and Mexican drug cartels is the increasingly sophisticated narco-tunnels being found along the US-Mexico border. According to investigative journalist Doug Farah, these tunnels resemble the types used by Hezbollah in Lebanon, raising the concern that Hezbollah is providing drug traffickers the technology to construct such smuggling channels. [34] Farah also notes that “numerous former intelligence and law enforcement officials have publicly discussed the appearance in recent years of arrested gang members entering the United States with Farsi tattoos and other goods that could indicate a Hezbollah influence.” Some US policymakers are keenly aware of the threat. Last year, Rep. Sue Myrick (R-NC), a member of the House Intelligence Committee, wrote a letter to Homeland Security Secretary Janet Napolitano calling for more intelligence gathering on Hezbollah activities on the US border and requesting that she “form a Homeland Security task force to engage U.S. and Mexican law enforcement and border patrol officials about Hezbollah’s presence, activities, and connections to gangs and rug cartels.” [35] Frankly, it would be more surprising if there was no cooperation between Hezbollah and Mexican cartels, given the obvious benefits to both criminal groups. The cartels are able to access Hezbollah’s smuggling and explosives expertise and links with drug trafficking networks in the Middle East and South Asia. Hezbollah is able to establish a presence in a lawless environment with ready access to the US border at the same time it promotes harmful activity to undermine the US social fabric. Conclusion Research demonstrates that Hezbollah—via its patrons Iran and Venezuela—has engaged the United States in an offensive strategy of asymmetric warfare designed to expand its influence in an area of strategic importance to the United States, to the detriment of US interests. Neither Hezbollah, Iran, nor Venezuela has made any secret of their strategy and objectives. Primarily because Hezbollah now enjoys “official” support from some governments in Latin America—including Venezuela, Bolivia, Ecuador, and Nicaragua—combined with the unwillingness of other governments to recognize its threat, we can expect to see the Hezbollah presence in Latin America become more active and deadly in the coming years. Hugo Chávez’s illness may complicate Venezuela’s risky support for Hezbollah (Ahmadenijad was forced to cancel another visit to Venezuela in September 2011 because of Chávez’s declining health), but unfortunately its terror network has metastasized in the Americas. Our research indicates, moreover, that the most tempting target for Hezbollah in the region is Brazil, one of the world’s ten largest economies with a population of 1 million Muslims.

# 1AR

## sq no solve gitmo

#### Efficiency and renewables measures now and they’re failing

SIN 12, Solar Industry News, “US Navy depends on solar energy to power Guantanamo Bay base”, February 13, <http://www.atissun.com/blog/6581/us-navy-depends-on-solar-energy-to-power-guantanamo-bay-base/>

The base is essentially an island on an island, or like “a ship at sea” as the Navy refers to the base’s operations. Everything required to maintain the base must be delivered by ship or aircraft; power costs three times as much in Guantanamo according to estimates, equating to more than $100,000 spent each day on fossil fuel. It costs nearly $12 million each year to supply light and water to the inmates of the camp’s prison alone. Some energy efficiency upgrades have been more symbolic than anything else, like when base commander U.S. Navy Capt. Kirk Hibbert eliminated an air conditioned SUV for the base’s cops on patrol and instead had the two officers ride bicycles. This was only an $800 annual savings, but it sent a message to the base to pay attention to their energy consumption. Another measure implemented to raise energy conservation awareness is the “mock utility bill”: base residents receive an electric bill each month, showing their average usage and what it costs (residents’ bills are paid courtesy of the US Navy). The idea is to shock base residents and their families into being more careful with their electricity usage since the average bill is typically 3 to 4 times what a family would pay state-side. Solar energy is playing a big part in the Navy’s plans on Guantanamo. A solar-powered fleet of 24 small electrical vans equipped with solar panel roofs are good for about 35 miles before requiring a charge, which works out to a weekly charge in most cases, given the compact geography of the base. A 1,200-panel solar array was installed by two Florida-based companies behind the base high school. It produces 430,000 kilowatt hours annually as well as supplying power to Guantanamo’s popular (and free) gym. The gym is also used as a hurricane shelter in extreme weather conditions. Working with the Navy to improve efficiency is another military unit operating on the base. The Marines who patrol the 17.4 miles of fence line enclosing the base allowed the Public Works department to change a third of the floodlights along the fence to solar-powered LED lights. These lights have operated without the assistance of the grid so far, although they remain grid-tied in case of too many cloudy or rainy days.

## SPIDERS

#### Our techy microgrid fails evidence applies to SPIDERS

Robert Ackerman, Signal Magazine, Feb 2012, Military Energy Enters SPIDERS Web, www.afcea.org/content/?q=node/2877

Johnson says that the system-of-systems integration of SPIDERS is its biggest challenge. The presence of power systems and control systems is complicated by adding the network communications and cybersecurity requirements. Bringing together all of the necessary expertise is a key to success, especially because incorporating any element into the architecture affects the others. Large power grids provide stability as a characteristic of their design and size. That stability does not automatically apply for a microgrid, Johnson points out. Microgrid stability must be ensured by a control system that balances power coming from multiple sources.

## solvency

#### Plan gets SMR

Andres and Breetz 11

Richard Andres, Professor of National Security Strategy at the National War College and a Senior Fellow and Energy and Environmental Security and Policy Chair in the Center for Strategic Research, Institute for National Strategic Studies, at the National Defense University, and Hanna Breetz, doctoral candidate in the Department of Political Science at The Massachusetts Institute of Technology, Small Nuclear Reactorsfor Military Installations:Capabilities, Costs, andTechnological Implications, [www.ndu.edu/press/lib/pdf/StrForum/SF-262.pdf](http://www.ndu.edu/press/lib/pdf/StrForum/SF-262.pdf)

Thus far, this paper has reviewed two of DOD’s most pressing energy vulnerabilities—grid insecurity and fuel convoys—and explored how they could be addressed by small reactors. We acknowledge that there are many uncertainties and risks associated with these reactors. On the other hand, failing to pursue these technologies raises its own set of risks for DOD, which we review in this section: first, small reactors may fail to be commercialized in the United States; second, the designs that get locked in by the private market may not be optimal for DOD’s needs; and third, expertise on small reactors may become concentrated in foreign countries. By taking an early “first mover” role in the small reactor market, DOD could mitigate these risks and secure the long-term availability and appropriateness of these technologies for U.S. military applications. The “Valley of Death.” Given the promise that small reactors hold for military installations and mobility, DOD has a compelling interest in ensuring that they make the leap from paper to production. However, if DOD does not provide an initial demonstration and market, there is a chance that the U.S. small reactor industry may never get off the ground. The leap from the laboratory to the marketplace is so difficult to bridge that it is widely referred to as the “Valley of Death.” Many promising technologies are never commercialized due to a variety of market failures— including technical and financial uncertainties, information asymmetries, capital market imperfections, transaction costs, and environmental and security externalities— that impede financing and early adoption and can lock innovative technologies out of the marketplace. 28 In such cases, the Government can help a worthy technology to bridge the Valley of Death by accepting the first mover costs and demonstrating the technology’s scientific and economic viability.29 [FOOTNOTE 29: There are numerous actions that the Federal Government could take, such as conducting or funding research and development, stimulating private investment, demonstrating technology, mandating adoption, and guaranteeing markets. Military procurement is thus only one option, but it has often played a decisive role in technology development and is likely to be the catalyst for the U.S. small reactor industry. See Vernon W. Ruttan, Is War Necessary for Economic Growth? (New York: Oxford University Press, 2006); Kira R. Fabrizio and David C. Mowery, “The Federal Role in Financing Major Inventions: Information Technology during the Postwar Period,” in Financing Innovation in the United States, 1870 to the Present, ed. Naomi R. Lamoreaux and Kenneth L. Sokoloff (Cambridge, MA: The MIT Press, 2007), 283–316.] Historically, nuclear power has been “the most clear-cut example . . . of an important general-purpose technology that in the absence of military and defense related procurement would not have been developed at all.”30 **Government involvement is likely to be crucial for innovative, next-generation nuclear technology** as well. Despite the widespread revival of interest in nuclear energy, Daniel Ingersoll has argued that radically innovative designs face an uphill battle, as “the high capital cost of nuclear plants and the painful lessons learned during the first nuclear era have created a prevailing fear of first-of-a-kind designs.”31 In addition, Massachusetts Institute of Technology reports on the Future of Nuclear Power called for the Government to provide modest “first mover” assistance to the private sector due to several barriers that have hindered the nuclear renaissance, such as securing high up-front costs of site-banking, gaining NRC certification for new technologies, and demonstrating technical viability.32 It is possible, of course, that small reactors will achieve commercialization without DOD assistance. As discussed above, they have garnered increasing attention in the energy community. Several analysts have even argued that small reactors could play a key role in the second nuclear era, given that they may be the only reactors within the means of many U.S. utilities and developing countries.33 However, given the tremendous regulatory hurdles and technical and financial uncertainties, it appears far from certain that the U.S. small reactor industry will take off. If DOD wants to ensure that small reactors are available in the future, then it should pursue a leadership role now. Technological Lock-in. A second risk is that if small reactors do reach the market without DOD assistance, the designs that succeed may not be optimal for DOD’s applications. Due to a variety of positive feedback and increasing returns to adoption (including demonstration effects, technological interdependence, network and learning effects, and economies of scale), the designs that are initially developed can become “locked in.”34 Competing designs—even if they are superior in some respects or better for certain market segments— can face barriers to entry that lock them out of the market. If DOD wants to ensure that its preferred designs are not locked out, then it should take a first mover role on small reactors. It is far too early to gauge whether the private market and DOD have aligned interests in reactor designs. On one hand, Matthew Bunn and Martin Malin argue that what the world needs is cheaper, safer, more secure, and more proliferation-resistant nuclear reactors; presumably, many of the same broad qualities would be favored by DOD.35 There are many varied market niches that could be filled by small reactors, because there are many different applications and settings in which they can be used, and it is quite possible that some of those niches will be compatible with DOD’s interests.36 On the other hand, DOD may have specific needs (transportability, for instance) that would not be a high priority for any other market segment. Moreover, while DOD has unique technical and organizational capabilities that could enable it to pursue more radically innovative reactor lines, DOE has indicated that it will focus its initial small reactor deployment efforts on LWR designs.37 **If DOD wants to ensure that its preferred reactors are developed and available in the future, it should take a leadership role now**. § Marked 13:26 § Taking a first mover role does not necessarily mean that DOD would be “picking a winner” among small reactors, as the market will probably pursue multiple types of small reactors. Nevertheless, **DOD leadership would likely have a profound effect on the industry’s timeline and trajectory.** Domestic Nuclear Expertise. From the perspective of larger national security issues, if DOD does not catalyze the small reactor industry, there is a risk that expertise in small reactors could become dominated by foreign companies. A 2008 Defense Intelligence Agency report warned that the United States will become totally dependent on foreign governments for future commercial nuclear power unless the military acts as the prime mover to reinvigorate this critical energy technology with small, distributed power reactors.38 Several of the most prominent small reactor concepts rely on technologies perfected at Federally funded laboratories and research programs, including the Hyperion Power Module (Los Alamos National Laboratory), NuScale (DOE-sponsored research at Oregon State University), IRIS (initiated as a DOE-sponsored project), Small and Transportable Reactor (Lawrence Livermore National Laboratory), and Small, Sealed, Transportable, Autonomous Reactor (developed by a team including the Argonne, Lawrence Livermore, and Los Alamos National Laboratories). However, there are scores of competing designs under development from over a dozen countries. If DOD does not act early to support the U.S. small reactor industry, there is a chance that the industry could be dominated by foreign companies. Along with other negative consequences, the decline of the U.S. nuclear industry decreases the NRC’s influence on the technology that supplies the world’s rapidly expanding demand for nuclear energy. Unless U.S. companies begin to retake global market share, in coming decades France, China, South Korea, and Russia will dictate standards on nuclear reactor reliability, performance, and **proliferation resistance**.

## 2nc at: ocean acid

No oceans impact

Idso, director of envt science – Peabody Energy, PhD Geography – ASU, Idso, professor – Maricopa County Community College, and Idso, PhD botany – ASU, ‘12

(Craig, Sherwood, and Keith, “The Potential for Adaptive Evolution to Enable the World's Most Important Calcifying Organism to Cope with Ocean Acidification,” *CO2 Science* Vol. 15, No. 28, July)

In an important paper published in the May 2012 issue of Nature Geoscience, Lohbeck et al. write that "our present understanding of the sensitivity of marine life to ocean acidification is based primarily on short-term experiments," which often depict negative effects. However, they go on to say that phytoplanktonic species with short generation times "may be able to respond to environmental alterations through adaptive evolution." And with this tantalizing possibility in mind, they studied, as they describe it, "the ability of the world's single most important calcifying organism, the coccolithophore Emiliania huxleyi, to evolve in response to ocean acidification in two 500-generation selection experiments."

Working with freshly isolated genotypes from Bergen, Norway, the three German researchers grew them in batch cultures over some 500 asexual generations at three different atmospheric CO2 concentrations - ambient (400 ppm), medium (1100 ppm) and high (2200 ppm) - where the medium CO2 treatment was chosen to represent the atmospheric CO2 level projected for the beginning of the next century. This they did in a multi-clone experiment designed to provide existing genetic variation that they said "would be readily available to genotypic selection," as well as in a single-clone experiment that was initiated with one "haphazardly chosen genotype," where evolutionary adaptation would obviously require new mutations. So what did they learn?

Compared with populations kept at ambient CO2 partial pressure, Lohbeck et al. found that those selected at increased CO2 levels "exhibited higher growth rates, in both the single- and multi-clone experiment, when tested under ocean acidification conditions." Calcification rates, on the other hand, were somewhat lower under CO2-enriched conditions in all cultures; but the research team reports that they were "up to 50% higher in adapted [medium and high CO2] compared with non-adapted cultures." And when all was said and done, they concluded that "contemporary evolution could help to maintain the functionality of microbial processes at the base of marine food webs § Marked 13:25 § in the face of global change [our italics]."

In other ruminations on their findings, the marine biologists indicate that what they call the swift adaptation processes they observed may "have the potential to affect food-web dynamics and biogeochemical cycles on timescales of a few years, thus surpassing predicted rates of ongoing global change including ocean acidification." And they also note, in this regard, that "a recent study reports surprisingly high coccolith mass in an E. huxleyi population off Chile in high-CO2 waters (Beaufort et al., 2011)," which observation is said by them to be indicative of "across-population variation in calcification, in line with findings of rapid microevolution identified here."

Warming won’t cause extinction

Barrett, professor of natural resource economics – Columbia University, ‘7

(Scott, Why Cooperate? The Incentive to Supply Global Public Goods, introduction)

First, climate change does not threaten the survival of the human species.5 If unchecked, it will cause other species to become extinction (though biodiversity is being depleted now due to other reasons). It will alter critical ecosystems (though this is also happening now, and for reasons unrelated to climate change). It will reduce land area as the seas rise, and in the process displace human populations. “Catastrophic” climate change is possible, but not certain. Moreover, and unlike an asteroid collision, large changes (such as sea level rise of, say, ten meters) will likely take centuries to unfold, giving societies time to adjust. “Abrupt” climate change is also possible, and will occur more rapidly, perhaps over a decade or two. However, abrupt climate change (such as a weakening in the North Atlantic circulation), though potentially very serious, is unlikely to be ruinous. Human-induced climate change is an experiment of planetary proportions, and we cannot be sur of its consequences. Even in a worse case scenario, however, global climate change is not the equivalent of the Earth being hit by mega-asteroid. Indeed, if it were as damaging as this, and if we were sure that it would be this harmful, then our incentive to address this threat would be overwhelming. The challenge would still be more difficult than asteroid defense, but we would have done much more about it by now.

#### Nuke war extinction

Alan **Robock 11**, prof of environmental sciences at Rutgers, “Nuclear winter is a real and present danger”, Nature, Volume: 473, Pages: 275–276

Yet the environmental threat of nuclear war has not gone away. The world faces the prospect of a smaller, but still catastrophic, nuclear conflict. There are now nine nuclear-weapons states. Use of a fraction of the global nuclear arsenal by anyone, from the superpowers to India versus Pakistan, still presents the largest potential environmental danger to the planet by humans. That threat is being ignored. One reason for this denial is that the prospect of a nuclear war is so horrific on so many levels that most people simply look away. Two further reasons are myths that persist among the general public: that the nuclear winter theory has been disproved, and that nuclear winter is no longer a threat. These myths need to be debunked. The term 'nuclear winter', coined by Carl Sagan and his colleagues in a 1983 paper1 in Science, describes the dramatic effects on the climate caused by smoke from fires ignited by nuclear attacks on cities and industrial areas. In the 1980s my colleagues and I calculated, using the best climate models available at the time, that if one-third of the existing arsenal was used, there would be so much smoke that surface temperatures would plummet below freezing around the world for months, killing virtually all plants and producing worldwide famine. More people could die in China from starvation than in the nations actively bombing each other. As many countries around the world realized that a superpower nuclear war would be a disaster for them, they pressured the superpowers to end their arms race. Sagan did a good job of summarizing the policy impacts2 in 1984: although weapons were continuing to be built, it would be suicide to use them. The idea of climatic catastrophe was fought against by those who wanted to keep the nuclear-weapon industry alive, or who supported the growth of nuclear arsenals politically3. Scientifically, there was no real debate about the concept, only about the details. In 1986, atmospheric researchers Starley Thompson and Stephen Schneider wrote a piece in Foreign Affairs appraising the theory4 and highlighting what they saw as the patchiness of the effect. They coined the term 'nuclear autumn', noting that it wouldn't be 'winter' everywhere in the aftermath of a nuclear attack. They didn't mean for people to think that it would be all raking leaves and football games, but many members of the public, and some pro-nuclear advocates, preferred to take it that way. The fight over the details of the modelling caused a rift between Sagan and Schneider that never healed. When I bring up the topic of nuclear winter, people invariably tell me that they think the theory has been disproved. But research continues to support the original concept. By 2007, models had began to approximate a realistic atmosphere up to 80 kilometres above Earth's surface, including the stratosphere and mesosphere. This enabled me, and my coauthors, to calculate for the first time that smoke particles would be heated by the Sun and lifted into the upper stratosphere, where they would stay for many years5, 6. So the cooling would last for much longer than we originally thought. Dark days Many of those who do accept the nuclear-winter concept think that the scenario applies only to a mass conflict, on a scale no longer conceivable in the modern world. This is also false. A 'small' nuclear war between India and Pakistan, with each using 50 Hiroshima-size bombs (far less than 1% of the current arsenal), if dropped on megacity targets in each country would produce climate change unprecedented in recorded human history5. Five million tonnes of black carbon smoke would be emitted into the upper troposphere from the burning cities, and then be lofted into the stratosphere by the heat of the Sun. Temperatures would be lower than during the 'Little Ice Age' (1400–1850), during which famine killed millions. For several years, growing seasons would be shortened by weeks in the mid-latitudes (see 'A decade of cooling).

## AT: Ogallala Aquifer

#### Farming makes it inev

Peters, writer for the Wall Street Journal, 10/28/2012

(Mark, “Farmers Watching Their Water Use,” http://online.wsj.com/article/SB10000872396390444592704578062901539482028.html?mod=googlenews\_wsj)

**For decades**, farmers here have tapped a vast underground reservoir to irrigate their fields to grow corn, soybeans and wheat. Now they are reluctantly starting to reduce their water use, fearing a dwindling supply could otherwise make them the last generation to grow bumper crops in this arid patch of the High Plains.

While Sandy is lashing the East Coast with heavy rain, much of Kansas and other parts of the Midwest are still feeling the effects of drought. Now, the years of heavy use have severely depleted this part of the Ogallala Aquifer—one of the world's largest such subterranean water sources—**to the point where some wells are drying up**. Government estimates **indicate there are two decades or less of adequate supply for irrigated farmland** in parts of Kansas and Texas that rely on the Ogallala.

The drought that plagued much of the Midwest and Great Plains this year has added to concerns, as farmers pumped out even more of the aquifer's water than usual.

## smart grid

#### No link – nuclear corporations aren’t VC

Matthew Stepp, Senior Policy Analyst with the Information Technology and Innovation Foundation (ITIF) specializing in climate change and clean energy policy, 11 [“An Anti-Innovation Strategy: The Heritage Foundations Deficit Reduction and Energy Proposal” The Energy Collective, April 27, http://theenergycollective.com/mstepp/56497/anti-innovation-strategy-heritage-foundations-deficit-reduction-and-energy-proposal]

Citing the examples of the Internet, computer chips, and GPS, the report claims, "Government programs that become commercial successes were not intended to meet a commercial demand." There are two problems with this. First, this is not a reason to eschew federal funding for future basic research and pre-commercial technology since, as Heritage acknowledges, such investments have resulted in technologies that launched entire new industries, fueled decades of American prosperity, and improved the lives of millions. Second, this claim is not universally true. For example, nuclear power, a technology born out of the government-organized Manhattan Project and supported by the precursors to the DOE, relied on tremendous federal support for its development and deployment, and was explicitly developed for commercial use. Private companies like General Electric and Westinghouse coordinated closely to guarantee that the government would support their high-risk, advanced technology ventures, and the Atomic Energy Commission was set up to ensure the safety and economic viability of the industry.

#### VC link irrelevant

Charles Fletcher, Associate at Intellectual Property based Lawfirm, 11 [“VCs and the cleantech funding divide,” AltAssets, November 3, http://old.altassets.net/index.php/private-equity-features/by-author-name/article/nz18489.html]

Public funding¶ While not the focus of this article, any discussion of the cleantech funding gap would be incomplete without mention of state backed sources of finance.¶ In the US, the US Department of Energy, the US Department of Agriculture and the 2008 Farm Bill have been instrumental in subsidising emerging clean technology sectors, including solar, wind and biofuels.¶ In the UK, the Carbon Trust has its own dedicated cleantech venture funds, which is one of the UK’s leading co-investors in clean technology. These funds are not just about profit – their focus is on reducing carbon emissions as well as earning financial return. Thus, the Carbon Trust can be a valuable source of financing for companies looking to bridge the cleantech funding gap.¶ Capital intensive cleantech companies should explore all options for obtaining favourable state finance (including grants, subsidies and direct investment opportunities): private investors increasingly expect companies to have done so as a matter of routine.¶ Summary¶ The dynamic of the venture capital model, which requires large multiple returns on investment, place restrictions on the ability of venture capital firms alone to fund some capital intensive clean technology companies. In addition, the recent economic environment has dramatically impacted private company valuations and their ability to raise equity.

#### No investment now

The Economic Times 12 [“Global venture capital funding in smart grid falls,” April 17, http://articles.economictimes.indiatimes.com/2012-04-17/news/31355437\_1\_smart-grid-smart-meter-raj-prabhu]

"The lackluster venture capital (VC) investing trend in smart grid continued into this year with a weak first quarter of $62 million going into 10 deals, compared to the last quarter with $66 million in ten deals. Funding amounts and deals are staying flat after peaking in 2010," a report by Mercom Capital Group, said. "VC funding in the last year has been on a steady decline. § Marked 13:25 § There seems to be a disconnect in smart grid between consumer interests & awareness, and the market offerings of smart grid technologies and products," said Raj Prabhu, managing partner at Mercom Capital Group.

## 1ar – obama folds

#### Avoiding the debt ceiling is inevitable—because political incentives, not capital

Ezra Klein, WaPo, 1/2/13, The lessons of the fiscal cliff, www.washingtonpost.com/blogs/wonkblog/wp/2013/01/02/the-lessons-of-the-fiscal-cliff/?wprss=rss\_ezra-klein

Republicans swear they are crazy enough to push the country into default, and they promise that the White House isn’t strong enough to stand by and let it happen. If they’re right, and the White House agrees to big spending cuts absent significant tax increases in order to avert default, then Republicans will have held taxes far lower than anyone thought possible.

But both Republicans and Democrats can’t be right. If we take the lessons of this negotiation, here’s what will happen: The White House will negotiate over the debt ceiling. They’ll say they’re not negotiating over the debt ceiling, and in the end, they may well refuse to be held hostage over the debt ceiling, but the debt ceiling will be part of the pressure Republicans use to force the next deal. The White House fears default, and in the end, they always negotiate.

That said, the Republicans aren’t quite as crazy as they’d like the Democrats to believe. They were scared to take the country over the fiscal cliff. They’re going to be terrified to force the country into default, as the economic consequences would be calamitous. They know they need to offer the White House a deal that the White House can actually take — or at least a deal that, if the White House doesn’t take it, doesn’t lead to Republicans shouldering the blame for crashing the global economy. That deal will have to include taxes, though the tax increases could come through reform rather than higher rates.

The Republicans also have a problem the White House doesn’t: The public broadly believes they’re less reasonable and willing to negotiate than the Democrats are. The White House has a reputation for, if anything, being too quick to fold. They have more room to avoid blame for a default than the Republicans do. In the end, if the White House holds its ground, Republicans will likely compromise — though only after the White House has done quite a bit of compromising, too.

#### Fiscal cliff proves—Obama will always cave to avoid the deadline

Noam Scheiber, TNR, 12/31/12, Democrats' Cliff Compromise Is Bad; But the Strategic Consequences Are Disastrous , www.tnr.com/blog/plank/111521/the-cliff-compromise-bad-the-strategic-consequences-are-disastrous#

My far bigger gripe with the whole fiscal-cliff exercise has always been the strategic dimension—how it affects the next showdown with the GOP, and the one after that. Coming into the negotiation, Obama had two big problems: First, no matter how tough he talked, Republicans always assumed he’d blink in the end, for the simple reason that he pretty much always had. (This is one of the major themes of my book about his first term.) Second, despite the results of the most recent election, in which Obama won a fairly commanding victory on a platform of raising taxes on wealthy people, the GOP continued to believe that public opinion was mostly on its side. House Republicans cited the preservation of their majority—never mind that their own candidates received fewer total votes than House Democratic candidates—and polls showing most Americans still think government is too big.

Fortunately, the fiscal cliff offered Obama a chance to solve both these problems. He could afford to be unyielding because the economic consequences of going over the cliff for a few days or weeks would be relatively minimal and almost entirely reversible. And doing so would immediately demonstrate to the GOP that public opinion was emphatically not on its side—polls showed that the public reaction to going over the cliff would be both intense and heavily trained on Republicans. Throw in Obama’s post-election bump in approval ratings, and there was never a better time to hold out.

Instead, the emerging deal will reinforce the convictions that have made the GOP such a toxic presence in Washington. If Obama will cave even when he’s got all the leverage, when won’t he cave? Never, the Republicans will assume. If Obama’s too scared to stop bargaining and let the public decide who’s right in this instance, when the polls appear to back him, then he must think our position is more popular than he lets on. Suffice it to say, these are not sentiments you want at the front of Republicans’ mind as they prepare to shake him down over the debt limit in another two months. The White House continues to maintain that it simply won't negotiate over the limit. After this deal, why would any Republican ever believe this? I certainly don’t, and I desperately want to.

As in previous rounds of Obama-GOP negotiations, a lot of liberals are surely hoping that the lunacy of the House Republicans will save us from Obama’s overly generous offers. And, it’s true, House Republicans can normally be relied upon to reject a deal that’s absurdly generous by any objective measure but falls short of their virtue-police standard of purity. They may well do so again tonight, inshallah. But that doesn’t solve the broader strategic problem. Obama has already shown his cards on the parameters that will define his negotiations with Republicans throughout his second term. And there’s no one to save us from that.

#### Obama will always fold to avoid default

NY Times, 1/1/13, Senate Passes Legislation to Allow Taxes on Affluent to Rise, www.nytimes.com/2013/01/02/us/politics/senate-tax-deal-fiscal-cliff.html?pagewanted=2&\_r=0&hp

Still, Democrats openly worried that if Mr. Obama could not drive a harder bargain when he holds most of the cards, he will give up still more Democratic priorities in the coming weeks, when hard deadlines will raise the prospects of a government default first, then a government shutdown. In both instances, conservative Republicans are more willing to breach the deadlines than in this case, when conservatives cringed at the prospects of huge tax increases.

“I just don’t think Obama’s negotiated very well,” said Senator Tom Harkin, Democrat of Iowa.

## at: balanced deal key

#### Concede balanced deal key to econ—it’s impossible

Daniel Gross, 12/31/12, Washington May Have a Deal on Taxes, but the Toughest Problems Remain, www.thedailybeast.com/articles/2012/12/31/washington-may-have-a-deal-on-taxes-but-the-toughest-problems-remain.html

Simply put, there is no political climate or constituency for a grand bargain. The fault lies overwhelmingly (although not entirely) with Republicans. A grand bargain would involve agreeing to raise tax revenues through boosting rates or loopholes while cutting entitlement and defense spending. But Republicans generally don’t believe in raising tax revenues (they’re never willing to name the loopholes they’d close), don’t want to cut entitlements for those who now receive them, and don’t want to cut defense spending. Democrats believe in raising tax revenues, but don’t want to cut entitlement for current and future recipients, and are ambivalent about defense cuts. Do you see the political common ground for a deal there? Me neither.

#### He’ll lose negotiations now—GOP will dig-in and Obama will fold

Kathleen Hennessey, LA Times, 12/31/12, Obama wins 'fiscal cliff' victory, but at high cost, www.latimes.com/news/nationworld/nation/la-na-fiscal-cliff-analysis-20130101,0,6417926.story

Others, however, expressed doubt that Obama would be able to achieve his additional goals now that his trump card had been played. The president's leverage in the current negotiations had been the automatic tax increase set to take effect Tuesday. If Republicans did not vote for a deal, taxes would go up for everyone, and polls indicated voters were inclined to blame them, not Obama.

The challenge of squeezing tax increases out of a Republican-led House will get harder, not easier, in the new year. Without the threat of an automatic tax increase, Obama has much less leverage, said Jared Bernstein, the former chief economist and economic advisor to Vice President Joe Biden. And Republicans will gain leverage through their threats to refuse an increase in the debt ceiling, which would cause the government to default on its bonds.

"While the White House had the leverage, it would have been very good for them to deal with the debt ceiling," Bernstein said. "The Republicans are absolutely sharpening their knives for that next fight, which is horrific, by comparison — a much worse self-inflicted wound on the economy."

#### Fiscal cliff proves Obama will roll over

Paul Krugman, 12/31/12, Conceder In Chief?, krugman.blogs.nytimes.com/2012/12/31/conceder-in-chief-2/

OK, now for the really bad news. Anyone looking at these negotiations, especially given Obama’s previous behavior, can’t help but reach one main conclusion: whenever the president says that there’s an issue on which he absolutely, positively won’t give ground, you can count on him, you know, giving way — and soon, too. The idea that you should only make promises and threats you intend to make good on doesn’t seem to be one that this particular president can grasp.

And that means that Republicans will go right from this negotiation into the debt ceiling in the firm belief that Obama can be rolled.

At that point he can redeem himself by holding firm — but because the Republicans don’t think he will, they will play tough, almost surely forcing him to actually hit the ceiling with all the costs that entails. And look, if I were a Republican I would also be betting that he’ll cave.

## 1ar – nuclear popular

#### DOD prevents backlash

Davenport 12

Coral Davenport, energy and environment correspondent for National Journal. Prior to joining National Journal in 2010, Davenport covered energy and environment for Politico, and before that, for Congressional Quarterly. In 2010, she was a fellow with the Metcalf Institute for Marine and Environmental Reporting. From 2001 to 2004, Davenport worked in Athens, Greece, as a correspondent for numerous publications, including the Christian Science Monitor and USA Today, covering politics, economics, international relations and terrorism in southeastern Europe. She also covered the 2004 Olympic Games in Athens, and was a contributing writer to the Fodor’s, Time Out, Eyewitness and Funseekers’ guidebook series. Davenport started her journalism career at the Daily Hampshire Gazette in Northampton, Massachusetts, after graduating from Smith College with a degree in English literature. National Journal, 2/10/12, White House Budget to Expand Clean-Energy Programs Through Pentagon, ProQuest

The White House believes it has figured out how to get more money for clean-energy programs touted by President Obama without having it become political roadkill in the wake of the Solyndra controversy: **Put it in the Pentagon**. While details are thin on the ground, lawmakers who work on both energy- and defense-spending policy believe the fiscal 2013 budget request to be delivered to Congress on Monday probably won't include big increases for wind and solar power through the Energy Department, a major target for Republicans since solar-panel maker Solyndra defaulted last year on a $535 million loan guarantee. But they do expect to see increases in spending on alternative energy in the Defense Department, such as programs to replace traditional jet fuel with biofuels, supply troops on the front lines with solar-powered electronic equipment, build hybrid-engine tanks and aircraft carriers, and increase renewable-energy use on military bases. While Republicans will instantly shoot down requests for fresh spending on Energy Department programs that could be likened to the one that funded Solyndra, many support alternative-energy programs for the military. "I do expect to see the spending," said Rep. Jack Kingston, R-Ga., a member of the House Defense Appropriations Subcommittee, when asked about increased investment in alternative-energy programs at the Pentagon. "I think in the past three to five years this has been going on, but that it has grown as a culture and a practice - and it's a good thing." "If Israel attacks Iran, and we have to go to war - and the Straits of Hormuz are closed for a week or a month and the price of fuel is going to be high," Kingston said, "the question is, in the military, what do you replace it with? It's not something you just do for the ozone. It's strategic." Sen. Lindsey Graham, R-S.C., who sits on both the Senate Armed Services Committee and the Defense Appropriations Subcommittee, said, "I don't see what they're doing in DOD as being Solyndra." "We're not talking about putting $500 million into a goofy idea," Graham told National Journal . "We're talking about taking applications of technologies that work and expanding them. I wouldn't be for DOD having a bunch of money to play around with renewable technologies that have no hope. But from what I understand, there are renewables out there that already work." A senior House Democrat noted that this wouldn't be the first time that the **Pentagon has been utilized to advance policies that wouldn't otherwise be supported**. "They did it in the '90s with medical research," said Rep. Henry Waxman, D-Calif., ranking member of the House Energy and Commerce Committee. In 1993, when funding was frozen for breast-cancer research programs in the National Institutes of Health, Congress boosted the Pentagon's budget for breast-cancer research - to more than double that of the health agency's funding in that area. **Politically, the strategy makes sense**. Republicans are ready to fire at the first sign of any pet Obama program, and renewable programs at the Energy Department are an exceptionally ripe target. That's because of Solyndra, but also because, in the last two years, the Energy Department received a massive $40 billion infusion in funding for clean-energy programs from the stimulus law, a signature Obama policy. When that money runs out this year, a request for more on top of it would be met with flat-out derision from most congressional Republicans. Increasing renewable-energy initiatives at the Pentagon can also help Obama advance his broader, national goals for transitioning the U.S. economy from fossil fuels to alternative sources. As the largest industrial consumer of energy in the world, the U.S. military can have a significant impact on energy markets - if it demands significant amounts of energy from alternative sources, it could help scale up production and ramp down prices for clean energy on the commercial market. Obama acknowledged those impacts in a speech last month at the Buckley Air Force Base in Colorado. "The Navy is going to purchase enough clean-energy capacity to power a quarter of a million homes a year. And it won't cost taxpayers a dime," Obama said. "What does it mean? It means that the world's largest consumer of energy - the Department of Defense - is making one of the largest commitments to clean energy in history," the president added. "That will grow this market, it will strengthen our energy security." Experts also hope that Pentagon engagement in clean-energy technology could help yield breakthroughs with commercial applications. Kingston acknowledged that the upfront costs for alternative fuels are higher than for conventional oil and gasoline. For example, the Air Force has pursued contracts to purchase biofuels made from algae and camelina, a grass-like plant, but those fuels can cost up to $150 a barrel, compared to oil, which is lately going for around $100 a barrel. Fuel-efficient hybrid tanks can cost $1 million more than conventional tanks - although in the long run they can help lessen the military's oil dependence, Kingston said Republicans recognize that the up-front cost can yield a payoff later. "It wouldn't be dead on arrival. But we'd need to see a two- to three-year payoff on the investment," Kingston said. Military officials - particularly Navy Secretary Ray Mabus, who has made alternative energy a cornerstone of his tenure - have been telling Congress for years that the military's dependence on fossil fuels puts the troops - and the nation's security - at risk. Mabus has focused on meeting an ambitious mandate from a 2007 law to supply 25 percent of the military's electricity from renewable power sources by 2025. (Obama has tried and failed to pass a similar national mandate.) Last June, the DOD rolled out its first department-wide energy policy to coalesce alternative and energy-efficient initiatives across the military services. In January, the department announced that a study of military installations in the western United States found four California desert bases suitable to produce enough solar energy - 7,000 megawatts - to match seven nuclear power plants. And so far, those **moves have met with approval from congressional Republicans**. Even so, any request for new Pentagon spending will be met with greater scrutiny this year. The Pentagon's budget is already under a microscope, due to $500 billion in automatic cuts to defense spending slated to take effect in 2013. But even with those challenges, clean-energy spending probably won't stand out as much in the military budget as it would in the Energy Department budget. Despite its name, the Energy Department has traditionally had little to do with energy policy - its chief portfolio is maintaining the nation's nuclear weapons arsenal. Without the stimulus money, last year only $1.9 billion of Energy's $32 billion budget went to clean-energy programs. A spending increase of just $1 billion would make a big difference in the agency's bottom line. But it would probably be easier to tuck another $1 billion or $2 billion on clean-energy spending into the Pentagon's $518 billion budget. Last year, the Pentagon spent about $1 billion on renewable energy and energy-efficiency programs across its departments.

#### Bipart support

Christine Todd **Whitman 12**, CASEnergy Co-Chair, Former EPA Administrator and New Jersey Governor, “Nuclear Power Garners Bipartisan Support”, August 13, <http://energy.nationaljournal.com/2012/08/finding-the-sweet-spot-biparti.php?rss=1&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+njgroup-energy+%28Energy+%26+Environment+Experts--Q+with+Answer+Previews%29#2237728>

The energy policy that I’ve seen garner consistent support from the left and the right over the years is also one with which I’m deeply familiar. This policy involves building a diverse portfolio of low-carbon energy sources, featuring a renewed investment in nuclear energy. And it’s not just policymakers from both sides of the aisle who support nuclear energy – it’s everyday energy consumers as well. According to a Gallup poll conducted in March of this year, nearly 60 percent of Americans support the use of nuclear energy to meet our nation’s electricity needs, and a majority support expanding America’s use of nuclear power. Next-generation nuclear energy projects are underway in Georgia, South Carolina and Tennessee, thanks in part to steady popular support, as well as support from President Obama, bipartisan congressional leaders and other policymakers at the federal and state levels. An additional 10 combined construction and operating licenses for 16 plants are under review by the Nuclear Regulatory Commission. This support is founded in the fact that nuclear energy, safely managed, provides an efficient, reliable source of energy. In fact, nuclear power is the only baseload source of carbon-free electricity. It provides nearly two-thirds of the nation’s low-carbon electricity, and will continue to be an important source of energy well into the future given the advent of innovative large and small reactor designs. The use of nuclear energy prevents more than 613 million metric tons of carbon dioxide every year – as much CO2 as is emitted by every passenger car in America. Bipartisan support for nuclear energy also stems from the boost that it provides to local job markets and to local and state economies. As nuclear energy expands and as more than half of the industry workforce approaches retirement, the industry offers growing opportunities for well-paying careers. The industry already supports more than 100,000 jobs, and the combination of retirements and the construction of new facilities could create as many as 25,000 new jobs in the near term. What’s more, the construction of a nuclear facility spurs the creation of other local jobs in industries ranging from manufacturing to hospitality. The industry generates between $40 and $50 billion in revenue and electricity sales, or some $470 million in total economic output and $40 million in labor wages at each U.S. facility every year. That’s a powerful economic engine and a positive impact that leaders are embracing. As America refocuses on cleaner energy policies that help boost our economy, nuclear power is becoming a clear and critical part of a secure, sustainable energy portfolio. We need electricity and we want clean air; with nuclear energy we can have both. It’s a source of power that leaders on both sides of the aisle can support.

#### Key party leaders

**NEI 10**, Nuclear Energy Institute, “2009: An Eventful Nuclear Year”, January, http://www.nei.org/resourcesandstats/documentlibrary/publications/nuclearenergyinsight/nuclear-energy-insight---january-2010/

The year began with President Obama taking office and promising a new focus on energy issues. He was quick to install a Nobel-winning secretary of energy who promised to advance nuclear energy as part of the nation’s energy policy. At a public meeting in November, the president said, "There's no reason why technologically we can’t employ nuclear energy in a safe and effective way. Japan does it and France does it and it doesn’t have greenhouse gas emissions, so it would be stupid for us not to do that in a much more effective way." Democrats and Republicans alike in Congress recognized the role that nuclear energy must play in energy and climate legislation. A House-passed bill regulating greenhouse gases included pronuclear provisions, and Senate leaders such as John Kerry, Joe Lieberman and Lindsey Graham advocated an increase in nuclear energy as part of a cleaner, more secure U.S. energy policy. Kerry and Graham said in the New York Times, “While we invest in renewable energy sources, we must also take advantage of nuclear power, our single largest contributor of emissions-free power.” In a related effort, the U.S. Environmental Protection Agency issued a finding that carbon emissions are a danger to public health, which could act as an incentive for Congress to enact legislation. Public opinion on nuclear power issues validated increased political support. An ABC News/Washington Post poll on energy policy in August showed that “support for nuclear power is up,” with 52 percent supporting the construction of more nuclear power plants, a six percent increase from a similar poll in 2001. A study by Bisconti Research found that a large majority of respondents think nuclear energy should be expanded as part of a low-carbon energy mix. In addition, two-thirds of respondents gave a high rating to the safety of nuclear power plants. Broad public acceptance of nuclear energy is due, in part, to safe, reliable operation of America’s 104 reactors. The U.S. operating fleet continued to generate power around the clock at near-record factors of more than 90 percent of maximum capacity. In 2009 the Three Mile Island reactor in Pennsylvania broke the world record for a pressurized water reactor of 705 continuous days of operation. Employees at the Davis-Besse plant in Ohio set a company record by working more than 10.2 million hours without an injury that resulted in a missed day of work, and the Ginna plant in New York completed a scheduled refueling outage in record time. The Nuclear Regulatory Commission granted operating license renewals and power uprates— which add generating capacity to existing plants— to several plants. Reactors at Vogtle in Georgia, Oyster Creek in New Jersey, and Beaver Valley, Susquehanna and Three Mile Island in Pennsylvania obtained NRC approval on their applications for 20-year license extensions. Power uprates were approved for Calvert Cliffs 1 and 2 in Maryland and for North Anna 1 and 2 in Virginia. The NRC continued to review applications for new reactors. In September, the NRC accepted a combined construction and operating license application from Florida Power and Light for two AP1000 reactors at Turkey Point in South Florida. To prepare for a new generation of nuclear plants, the industry worked with academia, organized labor, and state and federal leaders to develop a new generation of nuclear workers. Federal assistance from the NRC, DOE and the Department of Labor for nuclear studies and trades training at universities and community colleges increased dramatically last year. The National Association of Manufacturers and the AFL-CIO played important roles to promote nuclear jobs and training.

#### Specifically SMRs

**LaRouche**, 1/19/**11**, Small Modular Nuclear Reactors May Thrive After Obama , larouchepac.com/node/17243

In particular, OMB's opposition to letting DoE help U.S. nuclear vendors develop and license small, modular light-water reactors, runs directly counter to broad bipartisan backing for such reactors. Then-Senate Energy and Natural Resources Committee Chairman Jeff Bingaman (D-N.M.) was among lawmakers who introduced legislation to boost development of small, modular reactors, most of which use existing light-water cooling technology and typically are limited to 50 megawatts in generating capacity. Their smaller size make them easier to tie into the grid and attractive for varied uses, such as powering military bases and remote villages.

#### The public loves nukes AND every bill’s passing

King 11

Marcus King, Ph.D., Center for Naval Analyses Project Director and Research Analyst for the Environment and Energy TeamLaVar Huntzinger, Thoi Nguyen, March 2011, Feasibility of Nuclear Power on U.S.Military Installations, www.cna.org/sites/default/files/research/Nuclear Power on Military Installations D0023932 A5.pdf

Recent surveys show that American public opinion has shifted toward nuclear power. In survey results, those who say they favor nuclear energy moved from 49 percent in 1983 to 74 percent in 2010 [24]. In 1984, 35 percent gave a high rating to the safety of nuclear plants; today that number is 66 percent [25]. Increased government and congressional interest Favorable public perception has been one factor leading to greater government and bipartisan congressional interest in building new nuclear capacity. Federal and state governments have implemented policies such as tax relief and loan guarantees to facilitate the construction of new nuclear power plants [9]. President Obama announced that federal government loan guarantees would be awarded to build the first new nuclear power plants in the United States in three decades [26]. Bills have been introduced in Congress to provide funding for new nuclear research. § Marked 13:25 § For example, three bills were introduced in 2009 to promote the development of small nuclear reactors. The bills were intended to • Fund a research, development, and demonstration program to reduce manufacturing and construction costs related to small nuclear reactors • Create the right business environment for doubling production of nuclear energy • Carry out programs to develop and demonstrate two small modular nuclear reactor designs [27]. The three bills were referred to committees in the House of Representatives in early 2010. More significantly, funding was approved for the DOE small reactor program for fiscal year 2011.