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### Grid

**Advantage One---The DoD**

**Domestic DoD bases are vulnerable due to connectivity to the civilian grid.**

**Robitaille 12** (George, Department of Army Civilian & US Army War College, *Small Modular Reactors: The Army’s Secure Source of Energy?*, March, 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.

**The risk of cyber attacks against the civilian electricity grid is high.**

**Habiger 10** (Eugene, Commander in Chief – United States Strategic Command, Served as Director of Security and Emergency Operations – U.S. Department of Energy, Previously Deputy chief of staff for personnel – Headquarters U.S. Air Force, Vice commander – Headquarters Air Education and Training Command, Deputy Director, Later director, Programs and Evaluation, Office of the Deputy Chief of Staff, Programs and Resources, Headquarters U.S. Air Force, He was also the chairman of the Program Review Committee and the Air Force Board, *CYBERWARFARE AND CYBERTERRORISM: THE NEED FOR A NEW U.S. STRATEGIC APPROACH*, The Cyber Security Institute, http://www.army-technology.com/downloads/whitepapers/vehicle-protection/file1552/)

However, there are reasons to believe that what is going on now amounts to a fundamental shift as opposed to business as usual. Today’s network exploitation or information operation trespasses possess a number of characteristics that suggest that the line between espionage and conflict has been, or is close to being, crossed. (What that suggests for the proper response is a different matter.) First, the **number of cyber attacks** we are facing is growing significantly. Andrew Palowitch, a former CIA official now consulting with the US Strategic Command (STRATCOM), which oversees the Defense Department’s Joint Task Force‐Global Network Operations, recently told a meeting of experts that the Defense Department has experienced almost **80,000 computer attacks**, and some number of these assaults have actually “reduced” the military’s “operational capabilities.”20 Second, the nature of these attacks is starting to shift from penetration attempts aimed at gathering intelligence (cyber spying) to offensive efforts aimed at taking down systems (cyberattacks). Palowitch put this in stark terms last November, “We are currently in a cyber war and war is going on today.”21 Third, these recent attacks need to be taken in a broader strategic context. Both Russia and China have stepped up their offensive efforts and taken a much more aggressive cyber warfare posture. The Chinese have developed an openly discussed cyberwar strategy aimed at achieving electronic dominance over the U.S. and its allies by 2050. In 2007 the Department of Defense reported that for the first time China has developed first strike viruses, marking a major shift from prior investments in defensive measures.22 And in the intervening period China has launched a series of offensive cyber operations against U.S. government and private sector networks and infrastructure. In 2007, Gen. James Cartwright, the former head of STRATCOM and now the Vice Chairman of the Joint Chiefs of Staff, told the US‐China Economic and Security Review Commission that China’s ability to launch “denial of service” attacks to overwhelm an IT system is of particular concern. 23 Russia also has already begun to wage offensive cyberwar. At the outset of the recent hostilities with Georgia, Russian assets launched a series of cyberattacks against the Georgian government and its critical infrastructure systems, including media, banking and transportation sites.24 In 2007, cyberattacks that many experts attribute, directly or indirectly, to Russia shut down the Estonia government’s IT systems. Fourth, the current geopolitical context must also be factored into any effort to gauge the degree of threat of cyberwar. The start of the new Obama Administration has begun to help reduce tensions between the United States and other nations. And, the new administration has taken initial steps to improve bilateral relations specifically with both China and Russia. However, it must be said that over the last few years the posture of both the Chinese and Russian governments toward America has clearly become more assertive, and at times even aggressive. Some commentators have talked about the prospects of a cyber Pearl Harbor, and the pattern of Chinese and Russian behavior to date gives reason for concern along these lines: both nations have offensive cyberwarfare strategies in place; both nations have taken the cyber equivalent of building up their forces; both nations now regularly probe our cyber defenses looking for gaps to be exploited; both nations have begun taking actions that cross the line from cyberespionage to cyberaggression; and, our bilateral relations with both nations are increasingly fractious and complicated by areas of marked, direct competition. Clearly, there a sharp differences between current U.S. relations with these two nations and relations between the US and Japan just prior to World War II. However, from a strategic defense perspective, there are enough warning signs to warrant preparation. In addition to the threat of cyberwar, the limited resources required to carry out even a large scale cyberattack also makes likely the potential for a significant cyber terror attack against the United States. However, the lack of a long list of specific incidences of cyberterrorism should provide no comfort. There is **strong evidence** to suggest that al Qaeda has the ability to conduct cyberterror attacks against the United States and its allies. Al Qaeda and other terrorist organizations are extremely active in cyberspace, using these technologies to communicate among themselves and others, carry out logistics, recruit members, and wage information warfare. For example, al Qaeda leaders used email to communicate with the 9‐11 terrorists and the 9‐11 terrorists used the Internet to make travel plans and book flights. Osama bin Laden and other al Qaeda members routinely post videos and other messages to online sites to communicate. Moreover, there is evidence of efforts that al Qaeda and other terrorist organizations are actively developing cyberterrorism capabilities and seeking to carry out cyberterrorist attacks. For example, the Washington Post has reported that “U.S. investigators have found evidence in the logs that mark a browser's path through the Internet that al Qaeda operators spent time on sites that offer software and programming instructions for the digital switches that run power, water, transport and communications grids. In some interrogations . . . al Qaeda prisoners have described intentions, in general terms, to use those tools.”25 Similarly, a 2002 CIA report on the cyberterror threat to a member of the Senate stated that al Qaeda and Hezbollah have become "more adept at using the internet and computer technologies.”26 The FBI has issued bulletins stating that, “U. S. law enforcement and intelligence agencies have received indications that Al Qaeda members have sought information on Supervisory Control And Data Acquisition (SCADA) systems available on multiple SCADA‐related web sites.”27 In addition a number of jihadist websites, such as 7hj.7hj.com, teach computer attack and hacking skills in the service of Islam.28 While al Qaeda may lack the cyber‐attack capability of nations like Russia and China, there is every reason to believe its operatives, and those of its ilk, are as capable as the cyber criminals and hackers who routinely effect great harm on the world’s digital infrastructure generally and American assets specifically. In fact, perhaps, the most troubling indication of the level of the cyberterrorist threat is the countless, serious non‐terrorist cyberattacks routinely carried out by criminals, hackers, disgruntled insiders, crime syndicates and the like. If run‐of‐the‐mill criminals and hackers can **threaten power grids**, hack vital military networks, steal vast sums of money, take down a city’s of traffic lights, compromise the Federal Aviation Administration’s air traffic control systems, among other attacks, it is **overwhelmingly likely** that terrorists can carry out similar, if not more malicious attacks. Moreover, even if the world’s terrorists are unable to breed these skills, they can certainly buy them. There are untold numbers of cyber mercenaries around the world—sophisticated hackers with advanced training who would be willing to offer their services for the right price. Finally, given the nature of our understanding of cyber threats, there is always the possibility that we have already been the victim or a cyberterrorist attack, or such an attack has already been set but not yet effectuated, and we don’t know it yet. Instead, a well‐designed cyberattack has the capacity to cause widespread chaos, sow societal unrest, undermine national governments, spread paralyzing fear and anxiety, and create a state of utter turmoil, all without taking a single life. A sophisticated cyberattack could throw a nation’s banking and finance system into chaos causing markets to crash, prompting runs on banks, degrading confidence in markets, perhaps even putting the nation’s currency in play and making the government look helpless and hapless. In today’s difficult economy, imagine how Americans would react if vast sums of money were taken from their accounts and their supporting financial records were destroyed. A truly nefarious cyberattacker could carry out an attack in such a way (akin to Robin Hood) as to engender populist support and deepen rifts within our society, thereby making efforts to restore the system all the more difficult. A modestly advanced enemy could use a cyberattack to shut down (if not physically damage) one or more regional power grids. An entire region could be cast into total darkness, power‐dependent systems could be shutdown. An attack on one or more regional power grids could also cause cascading effects that could jeopardize our entire national grid. When word leaks that the blackout was caused by a cyberattack, the specter of a foreign enemy capable of sending the entire nation into darkness would only increase the fear, turmoil and unrest. While the finance and energy sectors are considered prime targets for a cyberattack, an attack on any of the 17 delineated critical infrastructure sectors could have a major impact on the United States. For example, our healthcare system is already technologically driven and the Obama Administration’s e‐health efforts will only increase that dependency. A cyberattack on the U.S. e‐health infrastructure could send our healthcare system into chaos and put countless of lives at risk. Imagine if emergency room physicians and surgeons were suddenly no longer able to access vital patient information. A cyberattack on our nation’s water systems could likewise cause widespread disruption. An attack on the control systems for one or more dams could put entire communities at risk of being inundated,and could create ripple effects across the water, agriculture, and energy sectors. Similar water control system attacks could be used to at least temporarily deny water to otherwise arid regions, impacting everything from the quality of life in these areas to agriculture. In 2007, the U.S. Cyber Consequences Unit determined that the destruction from a single wave of cyberattacks on critical infrastructures could exceed $700 billion, which would be the rough equivalent of 50 Katrina‐esque hurricanes hitting the United States all at the same time.29 Similarly, one IT security source has estimated that the impact of a single day cyberwar attack that focused on and disrupted U.S. credit and debit card transactions would be approximately $35 billion.30 Another way to gauge the potential for harm is in comparison to other similar noncyberattack infrastructure failures. For example, the August 2003 regional power grid blackout is estimated to have cost the U.S. economy up to $10 billion, or roughly .1 percent of the nation’s GDP. 31 That said, a cyberattack of the exact same magnitude would most certainly have a much larger impact. The origin of the 2003 blackout was almost immediately disclosed as an atypical system failure having nothing to do with terrorism. This made the event both less threatening and likely a single time occurrence. Had it been disclosed that the event was the result of an attack that could readily be repeated the impacts would likely have grown substantially, if not exponentially. Additionally, a cyberattack could also be used to disrupt our nation’s defenses or distract our national leaders in advance of a more traditional conventional or strategic attack. Many military leaders actually believe that such a disruptive cyber pre‐offensive is the most effective use of offensive cyber capabilities. This is, in fact, the way Russia utilized cyberattackers—whether government assets, governmentdirected/ coordinated assets, or allied cyber irregulars—in advance of the invasion of Georgia. Widespread distributed denial of service (DDOS) attacks were launched on the Georgian governments IT systems. Roughly a day later Russian armor rolled into Georgian territory. The cyberattacks were used to prepare the battlefield; they denied the Georgian government a critical communications tool isolating it from its citizens and degrading its command and control capabilities precisely at the time of attack. In this way, these attacks were the functional equivalent of conventional air and/or missile strikes on a nation’s communications infrastructure.32 One interesting element of the Georgian cyberattacks has been generally overlooked: On July 20th, weeks before the August cyberattack, the website of Georgian President Mikheil Saakashvili was overwhelmed by a more narrowly focused, but technologically similar DDOS attack.33 This should be particularly chilling to American national security experts as our systems undergo the same sorts of focused, probing attacks on a constant basis. The ability of an enemy to use a cyber attack to counter our offensive capabilities or soften our defenses for a wider offensive against the United States is much more than mere speculation. In fact, in Iraq it is already happening. Iraq insurgents are now using off‐the‐shelf software (costing just $26) to hack U.S. drones (costing $4.5 million each), allowing them to intercept the video feed from these drones.34 By hacking these drones the insurgents have succeeded in greatly reducing one of our most valuable sources of real‐time intelligence and situational awareness. If our enemies in Iraq are capable of such an effective cyberattack against one of our more sophisticated systems, consider what a more technologically advanced enemy could do. At the strategic level, in 2008, as the United States Central Command was leading wars in both Iraq and Afghanistan, a cyber intruder compromised the security of the Command and sat within its IT systems, monitoring everything the Command was doing. 35 This time the attacker simply gathered vast amounts of intelligence. However, it is clear that the attacker could have used this access to wage cyberwar—altering information, disrupting the flow of information, destroying information, taking down systems—against the United States forces already at war. Similarly, during 2003 as the United States prepared for and began the War in Iraq, the IT networks of the Department of Defense were hacked 294 times.36 By August of 2004, with America at war, these ongoing attacks compelled then‐Deputy Secretary of Defense Paul Wolfowitz to write in a memo that, "Recent exploits have reduced operational capabilities on our networks."37 This wasn’t the first time that our national security IT infrastructure was penetrated immediately in advance of a U.S. military option.38 In February of 1998 the Solar Sunrise attacks systematically compromised a series of Department of Defense networks. What is often overlooked is that these attacks occurred during the ramp up period ahead of potential military action against Iraq. The attackers were able to obtain vast amounts of sensitive information—information that would have certainly been of value to an enemy’s military leaders. There is no way to prove that these actions were purposefully launched with the specific intent to distract American military assets or degrade our capabilities. However, such ambiguities—the inability to specifically attribute actions and motives to actors—are the very nature of cyberspace. Perhaps, these repeated patterns of behavior were mere coincidence, or perhaps they weren’t. The potential that an enemy might use a cyberattack to soften physical defenses, increase the gravity of harms from kinetic attacks, or both, significantly increases the potential harms from a cyberattack. Consider the gravity of the threat and risk if an enemy, rightly or wrongly, believed that it could use a cyberattack to degrade our strategic weapons capabilities. Such an enemy might be convinced that it could win a war—conventional or even nuclear—against the United States. The effect of this would be to undermine our **deterrence**‐based defenses, making us significantly more at risk of a **major war.**

**SMR’s solve --- they address weaknesses which otherwise leads to nuclear retaliation.**

**Andres 11** (\*Richard B. – 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, \*\*Hanna L. Breetz – Doctoral candidate in the Department of Political Science at The Massachusetts Institute of Technology, *Small Nuclear Reactors for Military Installations: Capabilities, Costs, and Technological Implications*, Strategic Forum, National Defense University, Institute for National Strategic Studies, February 2011, http://www.ndu.edu/press/lib/pdf/StrForum/SF-262.pdf)

Small reactors and energy Security 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 en- ergy with an eye toward cutting costs, decreasing carbon emissions, and reducing energy-related vulnerabilities. These actions have resulted in programs that have signif- icantly reduced DOD energy consumption and green- house 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 re- port sponsored by the Department of Homeland Secu- rity suggests that a coordinated cyber attack 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 func- tion 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 black- out 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.10 The department has made ef- forts 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 renew- ables, 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 de- mands 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.

**Plus they eliminate the incentive for cyber attacks in the first place.**

**Loudermilk 11** (Micah, Research Associate for the Energy & Environmental Security Policy program with the Institute for National Strategic Studies at National Defense University*, Small Nuclear Reactors: Enabling Energy Security for Warfighters*, Small Wars Journal, March 27th 2011, http://smallwarsjournal.com/blog/small-nuclear-reactors-enabling-energy-security-for-warfighters)

Recognition of these facts led the Defense Science Board to recommend "islanding" U.S. military installations to mitigate the electrical grid's vulnerabilities. Although DOD has undertaken a wide array of energy efficiency programs and sought to construct renewable energy facilities on bases, these endeavors **will fall far short** of the desired goals and still leave bases unable to function in the event of long-term outages.

As the NDU report argues though, small nuclear reactors have the potential to alleviate domestic base grid vulnerabilities. With a capacity of anywhere between 25 and 300 megawatts, small reactors possess sufficient generation capabilities to power any military installation, and most likely some critical services in the areas surrounding bases, should a blackout occur. Moreover, making bases resilient to civilian power outages would **reduce the incentive** for an opponent to disrupt the grid in the event of a conflict as military capabilities would be unaffected. Military bases are also secure locations, reducing the associated fears that would surely arise from the distribution of reactors across the country. Furthermore, small nuclear reactors, by design, are significantly safer than prior generations of reactors due to passive safety features, simplified designs, sealed reactor cores, and lower operational requirements.

**Miscalculation and escalation is guaranteed.**

**Clarke 9** (Richard, Special adviser to the president for cyber security in the George W. Bush administration, Now chairman of Good Harbor Consulting, *War from Cyberspace*, The National Interest, December 22, http://nationalinterest.org/article/war-from-cyberspace-3278)

AS IN the 1960s, the speed of war is rapidly accelerating. Then, long-range missiles could launch from the prairie of Wyoming and hit Moscow in only thirty-five minutes. Strikes in cyber war move at a rate approaching the speed of light. And this speed favors a strategy of preemption, which means the chances that people can become trigger-happy are high. This, in turn, makes cyber war all the more likely. If a cyber-war commander does not attack quickly, his network may be destroyed first. If a commander does not preempt an enemy, he may find that the target nation has suddenly raised new defenses or even disconnected from the worldwide Internet. There seems to be a premium in cyber war to making the first move. And much as in the nuclear era, there is a real risk of escalation with cyber war. Nuclear war was generally believed to be something that might quickly grow out of conventional combat, perhaps initiated with tanks firing at each other in a divided Berlin. The speed of new technologies created enormous risks for crisis instability and miscalculation. Today, the risks of miscalculation are even higher, enhancing the chances that what begins as a battle of computer programs ends in a shooting war. Cyber war, with its low risks to the cyber warriors, may be seen by a decision maker as a way of sending a signal, making a point without actually shooting. An attacker would likely think of a cyber offensive that knocked out an electric-power grid and even destroyed some of the grid's key components (keeping the system down for weeks), as a somewhat antiseptic move; a way to keep tensions as low as possible. But for the millions of people thrown into the dark and perhaps the cold, unable to get food, without access to cash and dealing with social disorder, it would be in many ways the same as if bombs had been dropped on their cities. Thus, the nation attacked might well respond with "kinetic activity."

**It is the highest probability scenario for a nuclear WW3.**

**Lawson 9** (Sean, Assistant professor in the Department of Communication at the University of Utah, *Cross-Domain Response to Cyber Attacks and the Threat of Conflict Escalation*, May 13th 2009, http://www.seanlawson.net/?p=477)

Introduction

At a time when it seems impossible to avoid the seemingly growing hysteria over the threat of cyber war,[1] network security expert Marcus Ranum delivered a refreshing talk recently, “The Problem with Cyber War,” that took a critical look at a number of the assumptions underlying contemporary cybersecurity discourse in the United States. He addressed one issue in partiuclar that I would like to riff on here, the issue of conflict escalation–i.e. the possibility that offensive use of cyber attacks could escalate to the use of physical force. As I will show, his concerns are entirely legitimate as current U.S. military cyber doctrine assumes the possibility of what I call “**cross-domain responses**” to cyberattacks.

Backing Your Adversary (Mentally) into a Corner

Based on the premise that completely blinding a potential adversary is a good indicator to that adversary that an attack is iminent, Ranum has argued that

“The best thing that you could possibly do if you want to start **World War III** is launch a cyber attack. [...] When people talk about cyber war like it’s a practical thing, what they’re really doing is messing with the OK button for starting World War III. We need to get them to sit the f-k down and shut the f-k up.” [2]

He is making a point similar to one that I have made in the past: Taking away an adversary’s ability to make rational decisions could backfire. [3] For example, Gregory Witol cautions that

“attacking the decision makerÃ¢â‚¬â„¢s ability to perform rational calculations may cause more problems than it hopes to resolveÃ¢â‚¬Â¦ Removing the capacity for rational action may result in completely unforeseen consequences, including longer and bloodier battles than may otherwise have been.” [4]

Ã¯Â»Â¿Cross-Domain Response

So, from a theoretical standpoint, I think his concerns are well founded. But the current state of U.S. policy may be cause for even greater concern. It’s not just worrisome that a hypothetical blinding attack via cyberspace could send a signal of imminent attack and therefore trigger an irrational response from the adversary. What is also cause for concern is that current U.S. policy indicates that “kinetic attacks” (i.e. physical use of force) are seen as potentially legitimate responses to cyber attacks. Most worrisome is that current U.S. policy implies that a **nuclear response** is possible, something that policy makers have not denied in recent press reports.

The reason, in part, is that the U.S. defense community has increasingly come to see cyberspace as a “domain of warfare” equivalent to air, land, sea, and space. The definition of cyberspace as its own domain of warfare helps in its own right to blur the online/offline, physical-space/cyberspace boundary. But thinking logically about the potential consequences of this framing leads to some disconcerting conclusions.

If cyberspace is a domain of warfare, then it becomes possible to define “cyber attacks” (whatever those may be said to entail) as acts of war. But what happens if the U.S. is attacked in any of the other domains? It retaliates. But it usually does not respond only within the domain in which it was attacked. Rather, responses are typically “cross-domain responses”–i.e. a massive bombing on U.S. soil or vital U.S. interests abroad (e.g. think 9/11 or Pearl Harbor) might lead to air strikes against the attacker. Even more likely given a U.S. military “way of warfare” that emphasizes multidimensional, “joint” operations is a massive conventional (i.e. non-nuclear) response against the attacker in all domains (air, land, sea, space), simultaneously.

The possibility of “kinetic action” in response to cyber attack, or as part of offensive U.S. cyber operations, is part of the current (2006) National Military Strategy for Cyberspace Operations [5]:

Of course, the possibility that a cyber attack on the U.S. could lead to a U.S. nuclear reply constitutes possibly the ultimate in “cross-domain response.” And while this may seem far fetched, it has not been ruled out by U.S. defense policy makers and is, in fact, implied in current U.S. **defense policy documents**. From the National Military Strategy of the United States (2004):

“The term WMD/E relates to a broad range of adversary capabilities that pose potentially devastating impacts. WMD/E includes chemical, biological, radiological, nuclear, and enhanced high explosive weapons as well as other, more asymmetrical ‘weapons’. They may rely more on disruptive impact than destructive kinetic effects. For example, cyber attacks on US commercial information systems or attacks against transportation networks may have a greater economic or psychological effect than a relatively small release of a lethal agent.” [6]

The authors of a 2009 National Academies of Science report on cyberwarfare respond to this by saying,

“Coupled with the declaratory policy on nuclear weapons described earlier, this statement implies that the United States will regard certain kinds of cyberattacks against the United States as being in the same category as nuclear, biological, and chemical weapons, and thus that a nuclear response to certain kinds of cyberattacks (namely, cyberattacks with devastating impacts) may be possible. It also sets a relevant scale–a cyberattack that has an impact larger than that associated with a relatively small release of a lethal agent is regarded with the same or greater seriousness.” [7]

Asked by the New York Times to comment on this, U.S. defense officials would not deny that nuclear retaliation remains an option for response to a massive cyberattack:

“Pentagon and military officials confirmed that the United States reserved the option to respond in any way it chooses to punish an adversary responsible for a catastrophic cyberattack. While the options could include the use of nuclear weapons, officials said, such an extreme counterattack was hardly the most likely response.” [8] The rationale for this policy:

“Thus, the United States never declared that it would be bound to respond to a Soviet and Warsaw Pact conventional invasion with only American and NATO conventional forces. The fear of escalating to a nuclear conflict was viewed as a pillar of stability and is credited with helping deter the larger Soviet-led conventional force throughout the cold war. Introducing the possibility of a nuclear response to a catastrophic cyberattack would be expected to serve the same purpose.” [9]

Non-unique, Dangerous, and In-credible?

There are a couple of interesting things to note in response. First is the development of a new acronym, WMD/E (weapons of mass destruction or effect). Again, this acronym indicates a weakening of the requirement of physical impacts. In this new definition, mass effects that are not necessarily physical, nor necessarily destructive, but possibly only disruptive economically or even psychologically (think “shock and awe”) are seen as equivalent to WMD. This new emphasis on effects, disruption, and psychology reflects both contemporary, but also long-held beliefs within the U.S. defense community. It reflects current thinking in U.S. military theory, in which it is said that U.S. forces should be able to “mass fires” and “mass effects” without having to physically “mass forces.” There is a sliding scale in which the physical (often referred to as

the “kinetic”) gradually retreats–i.e. massed forces are most physical; massed fire is less physical (for the U.S. anyway); and massed effects are the least physical, having as the ultimate goal Sun Tzu’s “pinnacle of excellence,” winning without fighting.

But the emphasis on disruption and psychology in WMD/E has also been a key component of much of 20th century military thought in the West. Industrial theories of warfare in the early 20th century posited that industrial societies were increasingly interdependent and reliant upon mass production, transportation, and consumption of material goods. Both industrial societies and the material links that held them together, as well as industrial people and their own internal linkages (i.e. nerves), were seen as increasingly fragile and prone to disruption via attack with the latest industrial weapons: airplanes and tanks. Once interdependent and fragile industrial societies were hopelessly disrupted via attack by the very weapons they themselves created, the nerves of modern, industrial men and women would be shattered, leading to moral and mental defeat and a loss of will to fight. Current thinking about the possible dangers of cyber attack upon the U.S. are based on the same basic premises: technologically dependent and therefore fragile societies populated by masses of people sensitive to any disruption in expected standards of living are easy targets. Ultimately, however, a number of researchers have pointed out the pseudo-psychological, pseudo-sociological, and a-historical (not to mention non-unique) nature of these assumptions. [10] Others have pointed out that these assumptions did not turn out to be true during WWII strategic bombing campaigns, that modern, industrial societies and populations were far more resilient than military theorists had assumed. [11] Finally, even some military theorists have questioned the assumptions behind cyber war, especially when assumptions about our own technology dependence-induced societal fragility (dubious on their own) are applied to other societies, especially non-Western societies (even more dubious). [12]

Finally, where deterrence is concerned, it is important to remember that a deterrent has to be credible to be effective. True, the U.S. retained nuclear weapons as a deterrent during the Cold War. But, from the 1950s through the 1980s, there was increasing doubt among U.S. planners regarding the credibility of U.S. nuclear deterrence via the threat of “massive retaliation.” As early as the 1950s it was becoming clear that the U.S. would be reluctant at best to actually follow through on its threat of massive retaliation. Unfortunately, most money during that period had gone into building up the nuclear arsenal; conventional weapons had been marginalized. Thus, the U.S. had built a force it was likely never to use. So, the 1960s, 1970s, and 1980s saw the development of concepts like “flexible response” and more emphasis on building up conventional forces. This was the big story of the 1980s and the “Reagan build-up” (not “Star Wars”). Realizing that, after a decade of distraction in Vietnam, it was back in a position vis-a-viz the Soviets in Europe in which it would have to rely on nuclear weapons to offset its own weakness in conventional forces, a position that could lead only to blackmail or holocaust, the U.S. moved to create stronger conventional forces. [13] Thus, the question where cyber war is concerned:

If it was in-credible that the U.S. would actually follow through with massive retaliation after a Soviet attack on the U.S. or Western Europe, is it really credible to say that the U.S. would respond with nuclear weapons to a cyber attack, no matter how disruptive or destructive?

Beyond credibility, deterrence makes many other assumptions that are problematic in the cyber war context. It assumes an adversary capable of being deterred. Can most of those who would perpetrate a cyber attack be deterred? Will al-Qa’ida be deterred? How about a band of nationalistic or even just thrill-seeker, bandwagon hackers for hire? Second, it assumes clear lines of **command and control**. Sure, some hacker groups might be funded and assisted to a great degree by states. But ultimately, even cyber war theorists will admit that it is doubtful that states have complete control over their armies of hacker mercenaries. How will deterrence play out in this kind of scenario?

**And attacks collapse military war fighting capability.**

**Loudermilk 11** (Micah, Research Associate for the Energy & Environmental Security Policy program with the Institute for National Strategic Studies at National Defense University*, Small Nuclear Reactors: Enabling Energy Security for Warfighters*, Small Wars Journal, March 27th 2011, http://smallwarsjournal.com/blog/small-nuclear-reactors-enabling-energy-security-for-warfighters)

Last month, the Institute for National Strategic Studies at National Defense University released a report entitled Small Nuclear Reactors for Military Installations: Capabilities, Costs, and Technological Implications. Authored by Dr. Richard Andres of the National War College and Hanna Breetz from Harvard University, the paper analyzes the potential for the Department of Defense to incorporate small reactor technology on its domestic military bases and in forward operating locations. According to Andres and Breetz, the reactors have the ability to solve two critical vulnerabilities in the military's mission: the dependence of domestic bases on the civilian electrical grid and the challenge of supplying ample fuel to troops in the field. Though considerable obstacles would accompany such a move -- which the authors openly admit -- the benefits are significant enough to make the idea merit serious consideration. At its heart, a discussion about military uses of small nuclear reactors is really a conversation about securing the nation's war fighting capabilities. Although the point that energy security **is** national security has become almost redundant -- quoted endlessly in government reports, think tank papers, and the like -- it is repeated for good reason. Especially on the domestic front, the need for energy security on military bases is often overlooked. There is no hostile territory in the United States, no need for fuel convoys to constantly supply bases with fuel, and no enemy combatants. However, while bases and energy supplies are not directly vulnerable, the civilian electrical grid on which they depend for 99% of their energy use is -- and that makes domestic installations highly insecure. The U.S. grid, though a technological marvel, is extremely old, brittle, and susceptible to a wide variety of problems that can result in power outages -- the 2003 blackout throughout the Northeast United States is a prime example of this. In the past, these issues were largely limited to accidents including natural disasters or malfunctions, however today, intentional threats such as cyber attacks represent a very real and growing threat to the grid. Advances in U.S. military technology have further increased the risk that a grid blackout poses to the nation's military assets. As pointed out by the Defense Science Board, **critical missions** including national strategic awareness and national command authorities depend on the national transmission grid. Additionally, capabilities vital to troops in the field -- including drones and satellite intelligence/reconnaissance -- are lodged at bases within the United States and their loss due to a blackout would **impair the ability** of troops to operate in forward operating areas. Recognition of these facts led the Defense Science Board to recommend "islanding" U.S. military installations to mitigate the electrical grid's vulnerabilities. Although DOD has undertaken a wide array of energy efficiency programs and sought to construct renewable energy facilities on bases, these endeavors will fall far short of the desired goals and still leave bases unable to function in the event of long-term outages. As the NDU report argues though, small nuclear reactors have the potential to alleviate domestic base grid vulnerabilities. With a capacity of anywhere between 25 and 300 megawatts, small reactors possess sufficient generation capabilities to power any military installation, and most likely some critical services in the areas surrounding bases, should a blackout occur. Moreover, making bases resilient to civilian power outages would reduce the incentive for an opponent to disrupt the grid in the event of a conflict as military capabilities would be unaffected. Military bases are also secure locations, reducing the associated fears that would surely arise from the distribution of reactors across the country. Furthermore, small nuclear reactors, by design, are significantly safer than prior generations of reactors due to passive safety features, simplified designs, sealed reactor cores, and lower operational requirements.

**Conventional wars are inevitable --- ineffectiveness leads to major power aggression and violent competition.**

**Horowitz 9** (Michael C. Horowitz and Dan A. Shalmon, Professor of Political Science @ University of Pennsylvania & Senior Analyst @ Lincoln Group, LLC. *The Future of War and American Military Strategy*, Orbis, Spring 2009)

It is important to recognize at the outset two key points about United States strategy and the potential costs and benefits for the United States in a changing security environment. First, the United States is very likely to remain fully engaged in global affairs. Advocates of restraint or global withdrawal, while popular in some segments of academia, remain on the **margins** of policy debates in Washington D.C. This could always change, of course. However, at present, **it is a given** that the United States will define its interests globally and pursue a strategy that requires capable military forces able to project power around the world. Because ‘‘indirect’’ counter-strategies are the rational choice for actors facing a strong state’s power projection, irregular/asymmetric threats are inevitable given America’s role in the global order.24 Second, the **worst-case scenario** is a loss of U.S. conventional superiority. Losing military control of the sea and the air, ‘‘the global commons,’’25 would render American global strategy **outmoded in an instant**. The idea that the United States must improve its capacity to fight counterinsurgency operations presumes a need to do so beyond defending the homeland and that the United States will have the capacity to intervene in future conflicts around the world. However, while it seems unlikely at present, what if developments in warfare cut down and then eliminated the conventional military superiority of the United States? The loss of conventional military superiority by the United States would probably make the current strategic environment **look like a picnic**.26 For example, currently a Marine unit deploying to Afghanistan or Iraq focuses most on the post-deployment battlefield tasks. However, imagine a world where commanders and soldiers, like their World War II forbears, must fear being sunk on a transport ship or shot out of the sky on the way over, or being targeted by electronic, nanotechnological, or directed energy or precision guided munitions when preparing to search a village for insurgents.27 In such a strategic environment, overseas deployments to win hearts and minds in a low intensity war or wipe out radical jihadi groups would likely—and logically— take a backseat to more ‘‘traditional’’ concerns: convoys, tank battles, air and coastal defenses, and crash programs to build a new generation of naval and air weapons to take back the seas and skies. Meanwhile, in the interim, the United States homeland would be more at risk than at any point since the World War II—arguably more threatened than in its entire history. What John Mearsheimer has called the ‘‘stopping power of water’’ previously functioned to shield the United States, with its oceanic buffers to the east and west, from existential threats. However, in the information age and if the United States no longer controls the waterways of the world, water may not be enough. A world without American conventional military superiority would also **encourage aggression** by regional actors eager to settle scores and take advantage of the fact that the United States could no longer destroy their military forces at a low cost, to say nothing of the global dangers inherent in the **competition among major powers** that could result. The latter scenario is the worst case and it bears mentioning only because it should inform the framework in which any debate about defense strategy occurs. Pg. 307-308

**That competition goes nuclear.**

**Kagan 7** (Frederick Kagan and Michael O’Hanlon 7, Fred’s a resident scholar at AEI, Michael is a senior fellow in foreign policy at Brookings, “The Case for Larger Ground Forces”, April, <http://www.aei.org/files/2007/04/24/20070424_Kagan20070424.pdf>)

We live at a time when wars not only rage in nearly **every region** but threaten to erupt in many places where the current relative calm is tenuous. To view this as a strategic military challenge for the United States is not to espouse a specific theory of America’s role in the world or a certain political philosophy. Such an assessment flows directly from the basic bipartisan view of American foreign policy makers since World War II that overseas threats must be countered before they can directly threaten this country’s shores, that the basic stability of the international system is essential to American peace and prosperity, and that no country besides the United States is in a position to lead the way in countering major challenges to the global order. Let us highlight the threats and their consequences with a few concrete examples, emphasizing those that involve key strategic regions of the world such as the Persian **Gulf** and **East Asia**, or key potential threats to American security, such as the spread of nuclear weapons and the strengthening of the global **Al Qaeda**/jihadist movement. The Iranian government has rejected a series of international demands to halt its efforts at enriching uranium and submit to international inspections. What will happen if the US—or Israeli—government becomes convinced that Tehran is on the verge of fielding a nuclear weapon? **North Korea**, of course, has already done so, and the ripple effects are beginning to spread. **Japan**’s recent election to supreme power of a leader who has promised to rewrite that country’s constitution to support increased armed forces—and, possibly, even nuclear weapons— may well alter the delicate balance of fear in Northeast Asia fundamentally and rapidly. Also, in the background, at least for now, **Sino Taiwanese** tensions continue to flare, as do tensions between **India and Pakistan**, **Pakistan and Afghanistan**, **Venezuela** and the United States, and so on. Meanwhile, the world’s nonintervention in Darfur troubles consciences from Europe to America’s Bible Belt to its bastions of liberalism, yet with no serious international forces on offer, the bloodletting will probably, tragically, continue unabated. And as bad as things are in Iraq today, they could get worse. What would happen if the key Shiite figure, Ali al Sistani, were to die? If another major attack on the scale of the Golden Mosque bombing hit either side (or, perhaps, both sides at the same time)? Such deterioration might convince many Americans that the war there truly was lost—but the costs of reaching such a conclusion would be enormous. Afghanistan is somewhat more stable for the moment, although a major Taliban offensive appears to be in the offing. Sound US grand strategy must proceed from the recognition that, over the next few years and decades, the world is going to be a very unsettled and quite dangerous place, with Al Qaeda and its associated groups as a subset of a much larger set of worries. The only serious response to this international environment is to develop armed forces capable of protecting America’s vital interests throughout this dangerous time. Doing so requires a military capable of a wide range of missions—including not only deterrence of great power conflict in dealing with potential hotspots in Korea, the Taiwan Strait, and the Persian Gulf but also associated with a variety of Special Forces activities and stabilization operations. For today’s US military, which already excels at high technology and is increasingly focused on re-learning the lost art of counterinsurgency, this is first and foremost a question of finding the resources to field a large-enough standing Army and Marine Corps to handle personnel intensive missions such as the ones now under way in Iraq and Afghanistan. Let us hope there will be no such large-scale missions for a while. But preparing for the possibility, while doing whatever we can at this late hour to relieve the pressure on our soldiers and Marines in ongoing operations, is prudent. At worst, the only potential downside to a major program to strengthen the military is the possibility of spending a bit too much money. Recent history shows no link between having a larger military and its overuse; indeed, Ronald Reagan’s time in office was characterized by higher defense budgets and yet much less use of the military, an outcome for which we can hope in the coming years, but hardly guarantee. While the authors disagree between ourselves about proper increases in the size and cost of the military (with O’Hanlon preferring to hold defense to roughly 4 percent of GDP and seeing ground forces increase by a total of perhaps 100,000, and Kagan willing to devote at least 5 percent of GDP to defense as in the Reagan years and increase the Army by at least 250,000), we agree on the need to start expanding ground force capabilities by at least 25,000 a year immediately. Such a measure is not only prudent, it is also badly overdue.

### Warming

**Advantage 2---Warming**

**Warming is real, anthropogenic, and reversible if we start mitigation now.**

**Nuccitelli 11** (Dana, An environmental scientist at a private environmental consulting firm in the Sacramento, California area. He has a Bachelor's Degree in astrophysics from the University of California at Berkeley, and a Master's Degree in physics from the University of California at Davis. He has been researching climate science, economics, and solutions as a hobby since 2006, and has contributed to Skeptical Science since September, 2010., Updated 2011, Originally Posted 9/24/2010, *The Big Picture*, http://www.skepticalscience.com/big-picture.html)

The Earth is Warming We know the planet is warming from surface temperature stations and satellites measuring the temperature of the Earth's surface and lower atmosphere. We also have various tools which have measured the warming of the Earth's oceans. Satellites have measured an energy imbalance at the top of the Earth's atmosphere. Glaciers, sea ice, and ice sheets are all receding. Sea levels are rising. Spring is arriving sooner each year. There's simply no doubt - the planet is warming (Figure 1). Global Warming Continues And yes, the warming is continuing. The 2000s were hotter than the 1990s, which were hotter than the 1980s, which were hotter than the 1970s. 2010 tied for the hottest year on record. The 12-month running average global temperature broke the record three times in 2010, according to NASA Goddard Institute for Space Studies (GISS) data. Sea levels are still rising, ice is still receding, spring is still coming earlier, there's still a planetary energy imbalance, etc. etc. Contrary to what some would like us to believe, the planet has not magically stopped warming. Those who argue otherwise are confusing short-term noise with long-term global warming (Figure 2). Foster and Rahmstorf (2011) showed that when we filter out the short-term effects of the sun, volcanoes, and El Niño cycles, the underlying man-made global warming trend becomes even more clear (Figure 3). For as much as atmospheric temperatures are rising, the amount of energy being absorbed by the planet is even more striking when one looks into the deep oceans and the change in the global heat content (Figure 4). Humans are Increasing Atmospheric Greenhouse Gases The amount of greenhouse gases in the atmosphere - particularly carbon dioxide (CO2) - has been rising steadily over the past 150 years. There are a number of lines of evidence which clearly demonstrate that this increase is due to human activities, primarily burning fossil fuels. The most direct of evidence involves simple accounting. Humans are currently emitting approximately 30 billion tons of CO2 per year, and the amount in the atmosphere is increasing by about 15 billion tons per year. Our emissions have to go somewhere - half goes into the atmosphere, while the other half is absorbed by the oceans (which is causing another major problem - ocean acidification). We also know the atmospheric increase is from burning fossil fuels because of the isotopic signature of the carbon in the atmosphere. Carbon comes in three different isotopes, and plants have a preference for the lighter isotopes. So if the fraction of lighter carbon isotopes in the atmosphere is increasing, we know the increase is due to burning plants and fossil fuels, and that is what scientists observe. The fact that humans are responsible for the increase in atmospheric CO2 is settled science. The evidence is clear-cut. Human Greenhouse Gases are Causing Global Warming There is overwhelming evidence that humans are the dominant cause of the recent global warming, mainly due to our greenhouse gas emissions. Based on fundamental physics and math, we can quantify the amount of warming human activity is causing, and verify that we're responsible for essentially all of the global warming over the past 3 decades. The aforementioned Foster and Rahmstorf (2011) found a 0.16°C per decade warming trend since 1979 after filtering out the short-term noise. In fact we expect human greenhouse gas emissions to cause more warming than we've thus far seen, due to the thermal inertia of the oceans (the time it takes to heat them). Human aerosol emissions are also offsetting a significant amount of the warming by causing global dimming. Huber and Knutti (2011) found that human greenhouse gas emissions have caused 66% more global warming than has been observed since the 1950s, because the cooling effect of human aerosol emissions have offset about 44% of that warming. They found that overall, human effects are responsible for approximately 100% of the observed global warming over the past 60 years (Figure 5). There are also numerous 'fingerprints' which we would expect to see from an increased greenhouse effect (i.e. more warming at night, at higher latitudes, upper atmosphere cooling) that we have indeed observed (Figure 6). Climate models have projected the ensuing global warming to a high level of accuracy, verifying that we have a good understanding of the fundamental physics behind climate change. Sometimes people ask "what would it take to falsify the man-made global warming theory?". Well, basically it would require that our fundamental understanding of physics be wrong, because that's what the theory is based on. This fundamental physics has been scrutinized through scientific experiments for decades to centuries. The Warming will Continue We also know that if we continue to emit large amounts of greenhouse gases, the planet will continue to warm. We know that the climate sensitivity to a doubling of atmospheric CO2 from the pre-industrial level of 280 parts per million by volume (ppmv) to 560 ppmv (we're currently at 390 ppmv) will cause 2–4.5°C of warming. And we're headed for 560 ppmv in the mid-to-late 21st century if we continue business-as-usual emissions. The precise sensitivity of the climate to increasing CO2 is still fairly uncertain: 2–4.5°C is a fairly wide range of likely values. However, even if we're lucky and the climate sensitivity is just 2°C for doubled atmospheric CO2, if we continue on our current emissions path, we will commit ourselves to that amount of warming (2°C above pre-industrial levels) within the next 75 years. The Net Result will be Bad There will be some positive results of this continued warming. For example, an open Northwest Passage, enhanced growth for some plants and improved agriculture at high latitudes (though this will require use of more fertilizers), etc. However, the negatives will almost certainly outweigh the positives, by a long shot. We're talking decreased biodiversity, water shortages, increasing heat waves (both in frequency and intensity), decreased crop yields due to these impacts, damage to infrastructure, displacement of millions of people, etc. Arguments to the contrary are superficial One thing I've found in reading skeptic criticisms of climate science is that they're consistently superficial. For example, the criticisms of James Hansen's 1988 global warming projections never go beyond "he was wrong," when in reality it's important to evaluate what caused the discrepancy between his projections and actual climate changes, and what we can learn from this. And those who argue that "it's the Sun" fail to comprehend that we understand the major mechanisms by which the Sun influences the global climate, and that they cannot explain the current global warming trend. And those who argue "it's just a natural cycle" can never seem to identify exactly which natural cycle can explain the current warming, nor can they explain how our understanding of the fundamental climate physics is wrong. There are legitimate unresolved questions Much ado is made out of the expression "the science is settled." The science is settled in terms of knowing that the planet is warming rapidly, and that humans are the dominant cause. There are certainly unresolved issues. As noted above, there's a big difference between a 2°C and a 4.5°C warming for a doubling of atmospheric CO2, and it's an important question to resolve, because we need to know how fast the planet will warm in order to know how fast we need to reduce our greenhouse gas emissions. There are significant uncertainties in some feedbacks which play into this question. For example, will clouds act as a net positive feedback (by trapping more heat, causing more warming) or negative feedback (by reflecting more sunlight, causing a cooling effect) as the planet continues to warm? And exactly how much global warming is being offset by human aerosol emissions? These are the sorts of questions we should be debating, and the issues that most climate scientists are investigating. Unfortunately there is a there is a very vocal contingent of people determined to continue arguing the resolved questions for which the science has already been settled. And when climate scientists are forced to respond to the constant propagation of misinformation on these settled issues, it just detracts from our investigation of the legitimate, unresolved, important questions. Smart Risk Management Means Taking Action People are usually very conservative when it comes to risk management. Some of us buy fire insurance for our homes when the risk of a house fire is less than 1%, for example. When it comes to important objects like cars and homes, we would rather be safe than sorry. But there is arguably no more important object than the global climate. We rely on the climate for our basic requirements, like having enough accessible food and water. Prudent risk management in this case is clear. The scientific evidence discussed above shows indisputably that there is a risk that we are headed towards very harmful climate change. There are uncertainties as to how harmful the consequences will be, but uncertainty is not a valid reason for inaction. There's very high uncertainty whether I'll ever be in a car accident, but it would be foolish of me not to prepare for that possibility by purchasing auto insurance. Moreover, uncertainty cuts both ways, and it's just as likely that the consequences will be worse than we expect as it is that the consequences won't be very bad. We Can Solve the Problem The good news is that we have the tools we need to mitigate the risk posed by climate change. A number of plans have been put forth to achieve the necessary greenhouse gas emissions cuts (i.e. here and here and here). We already have all the technology we need. Opponents often argue that mitigating global warming will hurt the economy, but the opposite is true. Those who argue that reducing emissions will be too expensive ignore the costs of climate change - economic studies have consistently shown that mitigation is several times less costly than trying to adapt to climate change (Figure 7). This is why there is a consensus among economists with expertise in climate that we should put a price on carbon emissions (Figure 8). should US reduce emissions The Big Picture The big picture is that we know the planet is warming, humans are causing it, there is a substantial risk to continuing on our current path, but we don't know exactly how large the risk is. However, uncertainty regarding the magnitude of the risk is not an excuse to ignore it. We also know that if we continue on a business-as-usual path, the risk of catastrophic consequences is very high. In fact, the larger the uncertainty, the greater the potential for the exceptionally high risk scenario to become reality. We need to continue to decrease the uncertainty, but it's also critical to acknowledge what we know and what questions have been resolved, and that taking no action is not an option. The good news is that we know how to solve the problem, and that doing so will minimize the impact not only on the climate, but also on the economy. The bottom line is that from every perspective - scientific, risk management, economic, etc. - there is no reason not to immeditately take serious action to mitigate climate change, and failing to do so would be exceptionally foolish.

**SMRs are the only solution that adresses the magnitude of warming before its too late.**

**Palley 11 (**Reese Palley, The London School of Economics, 2011, The Answer: Why Only Inherently Safe, Mini Nuclear Power Plans Can Save Our World, p. 186-90)

The central investigation of this book has been directed at the scale of the nuclear industry. The book has argued that all anthropogenic challenges that put in question **continued human existence** on Earth are a **matter of scale**. It was nature’s unanticipated success with her human experiment, the evolutionary choice of brains over brawn, setting in motion the underlying scale problems that opened our Pandora’s box of calamities. The history of man on Earth can best be viewed as a race between population and resources in which, for some millennia, population expansion leads and the Earth’s resources have been straining to catch up. When population bloomed from 100 million brainy humans to a billion, the problems of scale emerged as the price we had to pay for success as a species. The conversion of forests to agriculture, responding to the need to feed a burgeoning population, initiated the emerging problem of scale. The elimination of oxygen-emitting forests was mitigated to a large measure in the beginning of our population growth by the slow rate of change of the deforestation, which allowed an absorbable increase of CO2 in the atmosphere. Natural processes, such as the ability of the oceans to take up CO2, tamped down global warming. But as the scale of the release of warming gases exploded a few hundred years ago, our remaining forests and our seas, our first line of defense against CO2 imbalance, could not cope and the level of CO2 has risen alarmingly each year since 1800. When human population climbed from a billion to six billion and these six billion reveled in the enormous energy content of coal, the scenario for **disaster on a global scale** came into play. The impact of the loss of forest paled in comparison to the havoc that the use of fossil fuels represented. In a world that was hungry for energy and, not incidentally, living on a Malthusian edge of food supply, coal burst upon us as manna from heaven. Coal was everywhere, easy to mine, and in enormous, almost unending supply It generated the cheap heat needed to run the engines of early industrialization. An unintended Faustian bargain was struck. The immediate cost of coal in the cities, dirt and pollution, were not out of sync with what urban man had lived with for centuries. It was beyond the science and the understanding of the time that burning vast millennial coal deposits would do little more than discommode the proximate few and benefit many. Again it was not the burning, it was **the scale** of the burning that dumped billions of tons of CO2 into the atmosphere. We are now presented with a horrendous invoice that must be paid if we are to **survive** in anywhere near the comfort to which we have become accustomed. It has been the intent of this book to argue that the **scale of the warming catastrophe** must be viewed primarily in terms of the continuing flow of CO2 into the atmosphere. Every possible source of CO2, no matter how small, must be identified and interdicted, since every fourth molecule of the gas will remain with us as a climate moderator for thousands of years. What we find is that all of the sources of energy including so-called green energy are CO2-culpable and that each, in spite of claims to the contrary, adds its tiny mite or enormous mass to the climate changes looming in man’s future. The book argues that the scale of the consumption of fossil fuels is clearly unsustainable and, more to the point, that the feeble attempts to restrict CO2 production are little more than a glossing over of the problem. Capping but not ending production of greenhouse gases only magnifies the unthinkable future costs of bringing the level of CO2 and other greenhouse gases back into balance. Logic dictates that merely limiting greenhouse gases pushes possible solutions farther and farther into the future and does little to mitigate the difficulties that will arise in the near future. Logic dictates that our reasonably comfortable survival depends on the immediate and total cessation of increases to parts per million of CO2 in the air. Logic dictates that if we are to continue to enjoy the level of comfort, wealth, and ease afforded us since the beginning of the twentieth century we must not only halt the increase but commence the actual decrease of warming gases at work in the atmosphere. That conclusion brings the book to the problems and the solutions inherent in nuclear power, the **only energy source** that can guarantee us a reasonable future that might be resistant to CO2 warming. Here the argument returns once again to the problem of scale of nuclear reactors, especially as the size of these reactors is related to the brief time left to us to get a grip on calamitous climate changes. The beginnings of nuclear energy lay in the demands of war. The battle between good and evil characterized by the Second World War gave hurried birth to a discovery that had the inherent power to both destroy and salvage. The power to destroy required plutonium on an enormous scale, which was projected forward into the postwar development of civilian reactors. The demand for scarce plutonium for the bombs of the cold war defined the type of reactors that were being developed. These were the breeder reactors, which spewed out plutonium measured in tons that had previously been available only in ounces, and would continue to do so when the wartime need was far behind us. What was once precious, rare, and desirable has become dangerous nuclear waste, and the imperfectly perceived scale of the waste problem has seriously inhibited the logical growth and development of nuclear power. By some unthinkable universal coincidence, nuclear power became available to man for war at the same time that it could prove to be the solution to man’s greatest peacetime challenge. But the gigawatt nuclear power plants that emerged from the war had within them the seeds of their own severe limitation. The scale of the risks, real and imagined, grew exponentially as the scale of energy output grew only linearly. These risks, some merely perceived, some dangerously real and some financial, have conspired to restrict the enormous expansion of nuclear power that is needed to quickly replace our present consumption of energy from fossil fuels. The present rate of replacement of fossil with nuclear sources is at a pace that will have little impact on ultimately dealing with the CO2 imbalance. This slow rate of change is compounded of public fears, bureaucratic regulatory mechanisms resistant to novel solutions, and a private capital market that is unable to conjure with the imagined and real risks of the huge gigawatt reactors that dominate the industry. It is a Gordian knot that cannot be unraveled but which can only be cut by a political sword that, alas, still lacks the edge to do the job. By another rare act of cosmic fortuity, there is a parallel existing nuclear technology that, barring political interference, is capable of addressing the scale problems inherent in gigawatt reactors. From the beginning of the nuclear era, researchers such as Weinberg and Wigner and Teller developed small, inherently safe nuclear reactors that did not breed plutonium. This was reason enough for the military, balancing urgent demands on research and development budgets, to consign the concept of “smaller and safer is better” to dusty shelves in our national science attic. This book has argued that small reactors, that produce a tenth of the energy of the giants also generate inordinately less of the risk that inhibits growth of the industry. Construction of small reactors is a fraction of the cost of construction of gigawatt reactors. Thus the number of years that scarce capital is tied up and at risk is substantially reduced. The book argues that a 100 MWe reactor88 is a much bigger hardware bargain than a gigawatt reactor, which, from start to output, can cost $15 billion. It is not only the hardware costs that contribute to the devilish details of risk. The problem is the inability of the market to accurately or even approximately estimate the real cost of the capital that would be tied up for over a decade in a project that, through technological advancements, could be obsolete before it ever joins the grid.

**All alternatives to SMRs are insufficiency in scope --- plus safety concerns are all hype.**

**Nordhaus 12** (Michael Shellenberger, Jessica Lovering, 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.

**The impact of warming is greater than all others. No humans will survive.**

**Brandenberg 99** (John & Monica Paxson, Visiting Prof. Researcher @ Florida Space Institute, Physicist Ph.D., Science Writer, Dead Mars Dying Earth, Pg 232-233)

The ozone hole expands, driven by a monstrous synergy with global warming that puts more catalytic ice crystals into the stratosphere, but this affects the far north and south and not the major nations’ heartlands. The seas rise, the tropics roast but the media networks no longer cover it. The Amazon rainforest becomes the Amazon desert. Oxygen levels fall, but profits rise for those who can provide it in bottles. An equatorial high-pressure zone forms, forcing drought in central Africa and Brazil, the Nile dries up and the monsoons fail. Then inevitably, at some unlucky point in time, a major unexpected event occurs—a major volcanic eruption, a sudden and dramatic shift in ocean circulation or a large asteroid impact (those who think freakish accidents do not occur have paid little attention to life or Mars), or a nuclear war that starts between Pakistan and India and escalates to involve China and Russia . . . Suddenly the gradual climb in global temperatures goes on a mad excursion as the oceans warm and release large amounts of dissolved carbon dioxide from their lower depths into the atmosphere. Oxygen levels go down precipitously as oxygen replaces lost oceanic carbon dioxide. Asthma cases double and then double again. Now a third of the world fears breathing. As the oceans dump carbon dioxide, the greenhouse effect increases, which further warms the oceans, causing them to dump even more carbon. Because of the heat, plants die and burn in enormous fires, which release more carbon dioxide, and the oceans evaporate, adding more water vapor to the greenhouse. Soon, we are in what is termed a runaway greenhouse effect, as happened to Venus eons ago. The last two surviving scientists inevitably argue, one telling the other, “See! I told you the missing sink was in the ocean!” Earth, as we know it, dies. After this Venusian excursion in temperatures, the oxygen disappears into the soil, the oceans evaporate and are lost and the dead Earth loses its ozone layer completely. Earth is too far from the Sun for it to be the second Venus for long. Its atmosphere is slowly lost—as is its water—because of ultraviolet bombardment breaking up all the molecules apart from carbon dioxide. As the atmosphere becomes thin, the Earth becomes colder. For a short while temperatures are nearly normal, but the ultraviolet sears any life that tries to make a comeback. The carbon dioxide thins out to form a thin veneer with a few wispy clouds and dust devils. Earth becomes the second Mars—red, desolate, with perhaps a few hardy microbes surviving.

**Every increase must be resisted**.

**Pittock 10** (Barrie, Led the Climate Impact Group in CSIRO until his retirement in 1999. He contributed to or was the lead author of all four major reports of the Intergovernmental Panel on Climate Change. He was awarded a Public Service Medal in 1999 and is CSIRO Honorary Fellow, *Climate Change: The Science, Impacts, and Solutions*, 2010, pg. 326)

It isabsolutelycrucial that options for reducing greenhouse gas emissions be pursued with a real sense of urgency. **Every extra tonne** of carbon dioxide placed into the atmosphere increases the very real risk of dangerous climate change**,** and nobody will escape the direct or indirect consequences.We are in danger of **inadvertently** tripping the 'on' switch to disaster, with an inevitably long delay before it can be turned off again. What is done now that enhances climate change cannot be easily undone, so we should **err on the side of caution***.* Butit is not all doom and gloom:we can save theday. As we have seen earlier in this book, the technology already exists to rapidly reduce emissions via large investments in energy efficiency (which saves money) and renewable base-load power (which will rapidly come down in price as it is scaled up). Supplemented later this century by large-scale carbon capture and sequestration and (if necessary) by safe nuclear power, the peak in greenhouse gas concentrations can be minimised and then brought down.We need to reduce carbon emissions**,** and we **need to do it fast.** Although we are facing an emergency**,** with an appropriate allocation of ingenuity and resources**,** together we can do it.We owe that, at least, to our children**.**

**The plan results in global SMR exports – massively reduces emissions.**

**Rosner 11** (Robert – Past Director of the Argonne National Laboratory, The William E. Wrather Distinguished Service Professor @ the Departments of Astronomy and Astrophysics and Physics, Enrico Fermi Institute, and the College, Senior Fellow @ the Computation Institute (CI), Stephen Goldberg – Special assistant to the director at Argonne National Laboratory, *Small Modular Reactors – Key to Future Nuclear Power Generation in the U.S.*, Energy Policy Institute at Chicago The Harris School of Public Policy Studies, Technical Paper, November 2011)

As stated earlier, SMRs have the potential to achieve significant greenhouse gas emission reductions. They could provide alternative baseload power generation to facilitate the retirement of older, smaller, and less efficient coal generation plants that would, otherwise, not be good candidates for retrofitting carbon capture and storage technology. They could be deployed in regions of the U.S. and the world that have less potential for other forms of carbon-free electricity, such as solar or wind energy. There may be technical or market constraints, such as projected electricity demand growth and transmission capacity, which would support SMR deployment but not GW-scale LWRs. From the on-shore manufacturing perspective, a key point is that the manufacturing base needed for SMRs can be developed domestically. Thus, while the large commercial LWR industry is seeking to transplant portions of its supply chain from current foreign sources to the U.S., the SMR industry offers the potential to establish a large domestic manufacturing base building upon already existing U.S. manufacturing infrastructure and capability, including the Naval shipbuilding and underutilized domestic nuclear component and equipment plants. The study team learned that a number of sustainable domestic jobs could be created – that is, the full panoply of design, manufacturing, supplier, and construction activities – if the U.S. can establish itself as a credible and substantial designer and manufacturer of SMRs. While many SMR technologies are being studied around the world, a strong U.S. commercialization program can enable U.S. industry to be first to market SMRs, thereby serving as a fulcrum for export growth as well as a lever in influencing international decisions on deploying both nuclear reactor and nuclear fuel cycle technology. A viable U.S.-centric SMR industry would enable the U.S. to recapture technological leadership in commercial nuclear technology, which has been lost to suppliers in France, Japan, Korea, Russia, and, now rapidly emerging, China.

### Solvency

**Plan --- The United States federal government should obtain, through alternative financing, electricity from small modular reactors for military instillations in the United States and reduce its relevant licensing restrictions on small modular reactors.**

**Contention Three – Solvency**

**Military action is necessary---it shapes technology development and overcomes market failures---that's key to commercialization.**

**Andres 11** (\*Richard B. – 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, \*\*Hanna L. Breetz – Doctoral candidate in the Department of Political Science at The Massachusetts Institute of Technology, *Small Nuclear Reactors for Military Installations: Capabilities, Costs, and Technological Implications*, Strategic Forum, National Defense University, Institute for National Strategic Studies, February 2011, http://www.ndu.edu/press/lib/pdf/StrForum/SF-262.pdf)

DoD as first Mover 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 un- certainties 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 mo- bility, DOD has a compelling interest in ensuring that they make the leap from paper to production. How- ever, 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 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 nu- clear 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, **M**assachusetts **I**nstitute of **T**echnology 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 nu- clear 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 ar- gued that small reactors could play a key role in the sec- ond 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 dem- onstration effects, technological interdependence, net- work 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 mar- ket. 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 de- signs. On one hand, Matthew Bunn and Martin Ma- lin 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 set- tings in which they can be used, and it is quite pos- sible 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. 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.

**Alternative financing arrangements uniquely reduces costs and spur commercial spillover.**

**Fitzpatrick 11** (Ryan Fitzpatrick, Senior Policy Advisor for Clean Energy at Third Way, Josh Freed, Vice President for Clean Energy at Third Way, and Mieke Eoyan, Director for National Security at Third Way, *Fighting for Innovation: How DoD Can Advance CleanEnergy Technology... And Why It Has To*, June 2011, content.thirdway.org/publications/414/Third\_Way\_Idea\_Brief\_-\_Fighting\_for\_Innovation.pdf)

The DoD has over $400 billion in annual purchasing power, which meansthe Pentagon could provide a sizeable market for new technologies. This can increase a technology’s scale of production, bringing down costs, and making the product more likely to successfully reach commercial markets. Unfortunately, many potentially significant clean energy innovations never get to the marketplace, due to a lack of capital during the development and demonstration stages. As a result, technologies that could help the military meet its clean energy security and cost goals are being abandoned or co-opted by competetors like China before they are commercially viable here in the U.S. By focusing its purchasing power on innovative products that will help meet its energy goals, DoD can provide more secure and cost-effective energy to the military—producing tremendous long-term savings, while also bringing potentially revolutionary technologies to the public. Currently, many of these technologies are passed over during the procurement process because of higher upfront costs—even if these technologies can reduce life-cycle costs to DoD. The Department has only recently begun to consider life-cycle costs and the “fullyburdened cost of fuel” (FBCF) when making acquisition decisions. However, initial reports from within DoD suggest that the methodology for determining the actual FBCF needs to be refined and made more consistent before it can be successfully used in the acquisition process.32 The Department should fast-track this process to better maximize taxpayer dollars. Congressional appropriators— and the Congressional Budget Office—should also recognize the savings that can be achieved by procuring advanced technologies to promote DoD’s energy goals, even if these procurements come with higher upfront costs. Even if the Pentagon makes procurement of emerging clean energy technologies a higher priority, it still faces real roadblocks in developing relationships with the companies that make them. Many clean energy innovations are developed by small businesses or companies that have no previous experience working with military procurement officers. Conversely, many procurement officers do not know the clean energy sector and are not incentivized to develop relationships with emerging clean energy companies. Given the stakes in developing domestic technologies that would help reduce costs and improve mission success, the Pentagon should develop a program to encourage a better flow of information between procurement officers and clean energy companies—especially small businesses. Leverage Savings From Efficiency and Alternative Financing to Pay for Innovation. In an age of government-wide austerity and tight Pentagon budgets, current congressional appropriations are simply not sufficient to fund clean energy innovation. Until Congress decides to direct additional resources for this purpose, the Defense Department must leverage the money and other tools it already has to help develop clean energy. This can take two forms: repurposing money that was saved through energy efficiency programs for innovation and using alternative methods of financing to reduce the cost to the Pentagon of deploying clean energy. For several decades the military has made modest use alternative financing mechanisms to fund clean energy and efficiency projects when appropriated funds were insufficient. In a 2010 report, GAO found that while only 18% of renewable energy projects on DoD lands used alternative financing, these projects account for 86% of all renewable energy produced on the Department’s property.33 This indicates that alternative financing can be particularly helpful to DoD in terms of bringing larger and more expensive projects to fruition. One advanced financing tool available to DoD is the energy savings performance contract (ESPC). These agreements allow DoD to contract a private firm to make upgrades to a building or other facility that result in energy savings, reducing overall energy costs without appropriated funds. The firm finances the cost, maintenance and operation of these upgrades and recovers a profit over the life of the contract. While mobile applications consume 75% of the Department’s energy,34 DoD is only authorized to enter an ESPC for energy improvements done at stationary sites. As such, Congress should allow DoD to conduct pilot programs in which ESPCs are used to enhance mobile components like aircraft and vehicle engines. This could accelerate the needed replacement or updating of aging equipment and a significant reduction of energy with no upfront cost. To maximize the potential benefits of ESPCs, DoD should work with the Department of Energy to develop additional training and best practices to ensure that terms are carefully negotiated and provide benefits for the federal government throughout the term of the contract.35 This effort could possibly be achieved through the existing memorandum of understanding between these two departments.36 The Pentagon should also consider using any long-term savings realized by these contracts for other energy purposes, including the promotion of innovative technologies to further reduce demand or increase general energy security. In addition to ESPCs, the Pentagon also can enter into extended agreements with utilities to use DoD land to generate electricity, or for the long-term purchase of energy. These innovative financing mechanisms, known respectively as enhanced use leases (EULs) and power purchase agreements (PPAs), provide a **valuable degree of certainty** to third party generators. In exchange, the Department can leverage its **existing resources**—either its land or its purchasing power—to negotiate lower electricity rates and dedicated sources of locallyproduced power with its utility partners. DoD has unique authority among federal agencies to enter extended 30-year PPAs, but only for geothermal energy projects and only with direct approval from the Secretary of Defense. Again, limiting incentives for clean energy generation to just geothermal power inhibits the tremendous potential of other clean energy sources to help meet DoD’s energy goals. Congress should consider opening this incentive up to other forms of clean energy generation, including the production of advanced fuels. Also, given procurement officials’ lack of familiarity with these extended agreements and the cumbersome nature of such a high-level approval process, the unique authority to enter into extended 30-year PPAs is very rarely used.37 DoD should provide officials with additional policy guidance for using extended PPAs and Congress should simplify the process by allowing the secretary of each service to approve these contracts. Congress should also investigate options for encouraging regulated utility markets to permit PPA use by DoD. Finally, when entering these agreements, the Department should make every effort to promote the use of innovative and fledgling technologies in the terms of its EULs and PPAs. CON C L U S ION The Defense Department is in a unique position to foster and deploy innovation in clean energy technologies. This has two enormous benefits for our military: it will make our troops and our facilities more secure and it will reduce the amount of money the Pentagon spends on energy, freeing it up for other mission critical needs. If the right steps are taken by Congress and the Pentagon, the military will be able to put its resources to work developing technologies that will lead to a stronger fighting force, a safer nation, and a critical emerging sector of the American economy. The Defense Department has helped give birth to technologies and new economic sectors dozens of times before. For its own sake and the sake of the economy, it should make clean energy innovation its newest priority.

**Regulatory reform is necessary---it sends a signal to investor that overcomes current barriers.**

**Loris 11** (Nicolas D. Loris – Research Associate in the Roe Institute, Jack Spencer – Research Fellow in Nuclear Energy in the Thomas A. Roe Institute for Economic Policy Studies, Currently is The Heritage Foundation’s senior research fellow in nuclear energy policy, Previously worked on commercial, civilian and military components of nuclear energy at the Babcock & Wilcox Companies, Holds a bachelor's degree in international politics from Frostburg State University and a master's degree from the University of Limerick, *A Big Future for Small Nuclear Reactors?*, February 2nd, http://www.heritage.org/research/reports/2011/02/a-big-future-for-small-nuclear-reactors)

Abstract: More and more companies—in the U.S. and abroad—are investing in new commercial nuclear enterprises, chief among them, small modular reactors (SMRs). The SMR industry is growing, with many promising developments in the works—which is precisely why the government should not interfere, as subsidies and government programs have already resulted in an inefficient system for large reactors. Heritage Foundation nuclear policy experts explain how the future for small reactors can remain bright. Small modular reactors (SMRs) have garnered significant attention in recent years, with companies of all sizes investing in these smaller, safer, and **more cost-efficient** nuclear reactors. Utilities are even forming partnerships with reactor designers to prepare for potential future construction. Perhaps most impressive is that most of this development is occurring without government involvement. Private investors and entrepreneurs are **dedicating resources** to these technologies based on their future prospects, not on government set-asides, mandates, or subsidies, and despite the current regulatory bias in favor of large light water reactors (LWRs). The result is a young, robust, innovative, and growing SMR industry. Multiple technologies are being proposed that each have their own set of characteristics based on price, fuel, waste characteristics, size, and any number of other variables. To continue this growth, policymakers should reject the temptation to offer the same sort of subsidies and government programs that have proven ineffective for large LWRs. While Department of Energy cost-sharing programs and capital subsidies seem attractive, they have yet to net any new reactor construction. Instead, policymakers should focus on the systemic issues that have continued to thwart the expansion of nuclear power in recent years. Specifically, the federal government needs to develop an efficient and **predictable regulatory pathway** to new reactor certification and to develop a sustainable nuclear waste management strategy. Why SMRs? Small modular reactors share many of the attractive qualities of large reactors, such as providing abundant emissions-free power, while adding new features that could make them more appropriate for certain applications, such as providing power to rural communities or for dedicated industrial use. SMRs are not yet positioned to take the place of traditional large LWRs, but they represent an important growth area for the commercial nuclear industry. Indeed, should the promise of small modular reactors be realized, the technology could transform the nuclear industry. That is because these attributes would potentially mitigate some of the financial and regulatory problems that nuclear energy has recently faced. SMRs potentially cost less (at least in up-front capital), are more mobile and multifunctional, provide competition, and can largely be produced by existing domestic infrastructure. Lower Costs Up Front. Large reactors are very expensive to license and construct and require massive up-front capital investments to begin a project. Small reactors, while providing far less power than large reactors, can be built in modules and thus be paid for over time. For example, estimates for larger reactors range from $6 billion to $10 billion and must be financed all at once. The Babcock & Wilcox Company’s modular mPower reactors, alternatively, can be purchased in increments of 125 megawatts (MW), which would allow costs to be spread out over time. Though cost estimates are not yet available for the mPower reactor, its designers have stated that they will be competitive. This should not be used as a reason to refrain from building larger, 1,000-plus MW reactors. Each utility will have its own set of variables that it must consider in choosing a reactor technology, but given that one of the primary justifications for government subsidies is that the high costs of large reactors puts unacceptable strain on utility balance sheets, an option that spreads capital outlays over time should be attractive. Safe Installation in Diverse Locations. Some designs are small enough to produce power for as few as 20,000 homes. One such reactor, Hyperion Power’s HPM (Hyperion Power Module) offers 25 MW of electricity for an advertised cost of $50 million per unit. This makes the HPM a potential power solution for isolated communities or small cities.[1] The Alaskan town of Galena, for example, is planning to power its community with a small reactor designed by Toshiba, while Fairbanks is looking into a small plant constructed by Hyperion.[2] In addition, Western Troy Capital Resources has stated that it will form a private corporation to provide electric power from small reactors for remote locations in Canada.[3] Public utility officials in Grays Harbor, Washington, have spoken with the NuScale Power company about powering the community with eight small nuclear plants;[4] and Hyperion Power has reported a high level of interest in small nuclear reactor designs from islands around the world.[5] Using a small nuclear reactor could cut electricity costs in isolated areas since there would be no need for expensive transmission lines to carry power to remote locations.[6] SMRs could also potentially be integrated into existing energy infrastructure. SMRs could be built into old coal plants, for instance. The reactors would replace the coal boilers and be hooked into the existing turbines and distribution lines. According to the Nuclear Regulatory Commission, these modifications could be completed safely since small reactors will likely be easier to control during times of malfunction.[7] Multi-functionality. SMRs can be used in a variety of applications that have substantial power and heat requirements. The chemical and plastics industries and oil refineries all use massive amounts of natural gas to fuel their operations. Similarly, small reactors could produce the heat needed to extract oil from tar sands, which currently requires large amounts of natural gas. While affordable today, natural gas prices vary significantly over time, so the long-term predictable pricing that nuclear provides could be very attractive. SMRs may also provide a practical solution for desalination plants (which require large amounts of electricity) that can bring fresh water to parts of the world where such supplies are depleting.[8] Perhaps most important, is that SMRs have the potential to bring power and electricity to the 1.6 billion people in the world today that have no access to electricity, and to the 2.4 billion that rely on biomass, such as wood, agricultural residue, and dung for cooking and heating.[9] Competition. While competition among large nuclear-reactor technologies currently exists, small reactors will add a new dimension to nuclear-reactor competition. Multiple small technology designs are set to emerge on the market. Not only will competition among small reactors create a robust market, it will also provide an additional incentive for large reactors to improve. If smaller reactors begin to capture a share of the nuclear market and the energy market at large, it will drive innovation and ultimately lower prices for both new and existing technologies. Domestic Production. Although the nuclear industry necessarily shrank to coincide with decreased demand, much of the domestic infrastructure remains in place today and could support the expansion of small-reactor technologies. Although the industrial and intellectual base has declined over the past three decades, forging production, heavy manufacturing, specialized piping, mining, fuel services, and skilled labor could all be found in the United States. Lehigh Heavy Forge Corporation in Bethlehem, Pennsylvania, could build the forges while Babcock & Wilcox could provide the heavy nuclear components, for instance. AREVA/Northrop Grumman Shipbuilding broke ground on a heavy components manufacturing facility last June.[10] Further, a number of companies are expanding manufacturing, engineering, and uranium enrichment capabilities—all in the United States. If SMRs are so great, where is the construction? While some designs are closer to market introduction than others, the fact is that America’s **regulatory** and policy environment is not sufficient to support a robust expansion of existing nuclear technologies, much less new ones. New reactor designs are difficult to license efficiently, and the lack of a sustainable nuclear waste management policy causes significant risk to private investment. Many politicians are attempting to mitigate these market challenges by offering subsidies, such as loan guarantees. While this approach still enjoys broad support in Congress and industry, the reality is that it has not worked. Despite a lavish suite of subsidies offered in the Energy Policy Act of 2005, including loan guarantees, insurance against government delays, and production tax credits, no new reactors have been permitted, much less constructed. These subsidies are in addition to existing technology development cost-sharing programs that have been in place for years and defer significant research and development costs from industry to the taxpayer. The problem with this approach is that it ignores the larger systemic problems that create the unstable marketplace to begin with. These systemic problems generally fall into three categories: Licensing. The Nuclear Regulatory Commission (NRC) is ill prepared to build the regulatory framework for new reactor technologies, and no reactor can be offered commercially without an NRC license. In a September 2009 interview, former NRC chairman Dale E. Klein said that small nuclear reactors pose a dilemma for the NRC because the commission is uneasy with new and unproven technologies and feels more comfortable with large light water reactors, which have been in operation for years and has a long safety record.[11] The result is that enthusiasm for building non-light-water SMRs is generally squashed at the NRC as potential customers realize that there is little chance that the NRC will permit the project within a timeframe that would promote near-term investment. So, regardless of which attributes an SMR might bring to the market, the **regulatory risk** is such that real progress on commercialization is difficult to attain. This then leaves large light water reactors, and to a lesser extent, small ones, as the least risky option, which pushes potential customers toward that technology, which then undermines long-term progress, competition, and innovation. Nuclear Waste Management. The lack of a sustainable nuclear waste management solution is perhaps the greatest obstacle to a broad expansion of U.S. nuclear power. The federal government has failed to meet its obligations under the 1982 Nuclear Waste Policy Act, as amended, to begin collecting nuclear waste for disposal in Yucca Mountain. The Obama Administration’s attempts to shutter the existing program to put waste in Yucca Mountain without having a backup plan has worsened the situation. This outcome was predictable because the current program is based on the flawed premise that the federal government is the appropriate entity to manage nuclear waste. Under the current system, waste producers are able to largely ignore waste management because the federal government is responsible. The key to a sustainable waste management policy is to directly connect financial responsibility for waste management to waste production. This will increase demand for more waste-efficient reactor technologies and drive innovation on waste-management technologies, such as reprocessing. Because SMRs consume fuel and produce waste differently than LWRs, they could contribute greatly to an economically efficient and sustainable nuclear waste management strategy. Government Intervention. Too many policymakers believe that Washington is equipped to guide the nuclear industry to success. So, instead of creating a stable regulatory environment where the market value of different nuclear technologies can determine their success and evolution, they choose to create programs to help industry succeed. Two recent Senate bills from the 111th Congress, the Nuclear Energy Research Initiative Improvement Act (S. 2052) and the Nuclear Power 2021 Act (S. 2812), are cases in point. Government intervention distorts the normal market processes that, if allowed to work, would yield the most efficient, cost-effective, and appropriate nuclear technologies. Instead, the federal government picks winners and losers through programs where bureaucrats and well-connected lobbyists decide which technologies are permitted, and provides capital subsidies that allow investors to ignore the systemic problems that drive risk and costs artificially high. This approach is especially detrimental to SMRs because subsidies to LWRs distort the relative benefit of other reactor designs by artificially lowering the cost and risk of a more mature technology that already dominates the marketplace. How to Fix a Broken System At the Global Nuclear Renaissance Summit on July 24, 2008, then-NRC chairman Dale Klein said that a nuclear renaissance with regard to small reactors will take “decades to unfold.”[12] If Members of Congress and government agencies do not reform their current approach to nuclear energy, this will most certainly be the case. However, a new, market-based approach could lead to a different outcome. Instead of relying on the policies of the past, Congress, the Department of Energy, and the NRC should pursue a new, 21st-century model for small and alternative reactor technologies by doing the following: Reject additional loan guarantees. Loan guarantee proponents argue that high up-front costs of new large reactors make them unaffordable without loan guarantees. Presumably, then, a smaller, less expensive modular option would be very attractive to private investors even without government intervention. But loan guarantees undermine this advantage by subsidizing the capital costs and risk associated with large reactors. A small reactor industry without loan guarantees would also provide competition and downward price pressure on large light water reactors. At a minimum, Congress should limit guarantees to no more than two plants of any reactor design and limit to two-thirds the amount of any expanded loan guarantee program that can support a single technology. Such eligibility limits will prevent support from going only to a single basic technology, such as large light water reactors.[13] Avoid subsidies. Subsidies do not work if the objective is a diverse and economically sustainable nuclear industry. Despite continued attempts to subsidize the nuclear industry into success, the evidence demonstrates that such efforts invariably fail. The nuclear industry’s success stories are rooted in the free market. Two examples include the efficiency and low costs of today’s existing plants, and the emergence of a private uranium enrichment industry. Government intervention is the problem, as illustrated by the government’s inability to meet its nuclear waste disposal obligations. Build expertise at the Nuclear Regulatory Commission. The NRC is built to regulate large light water reactors. It simply does not have the regulatory capability and resources to efficiently regulate other technologies, and building that expertise takes time. Helping the NRC to develop that expertise now would help bring new technologies into the marketplace more smoothly. Congress should direct and resource the NRC to develop additional broad expertise for liquid metal-cooled, fast reactors and high-temperature, gas-cooled reactors. With its existing expertise in light water technology, this additional expertise would position the NRC to effectively regulate an emerging SMR industry. Establish a new licensing pathway. The current licensing pathway relies on reactor customers to drive the regulatory process. But absent an efficient and predictable regulatory pathway, few customers will pursue these reactor technologies. The problem is that the legal, regulatory, and policy apparatus is built to support large light water reactors, effectively discriminating against other technologies. Establishing an alternative **licensing pathway** that takes the unique attributes of small reactors into consideration could help build the necessary regulatory support on which commercialization ultimately depends.[14] Resolve staffing, security, construction criteria, and fee-structure issues by December 31, 2011. The similarity of U.S. reactors has meant that the NRC could establish a common fee structure and many general regulatory guidelines for areas, such as staffing levels, security requirements, and construction criteria. But these regulations are inappropriate for many SMR designs that often have smaller staff requirements, unique control room specifications, diverse security requirements, and that employ off-site construction techniques. Subjecting SMRs to regulations built for large light water reactors would add cost and result in less effective regulation. The NRC has acknowledged the need for this to be resolved and has committed to doing so, including developing the budget requirements to achieve it. It has not committed to a specific timeline.[15] Congress should demand that these issues be resolved by the end of 2011.

**Federal signal is key**

Wallace and Williams 12 (Michael Wallace comes to CSIS from Constellation Energy, where he served as vice chairman and COO. During his nine years at Constellation Energy, he led many company business activities, including the formation and operation of two joint ventures with EDF related to nuclear energy. Prior to joining Constellation Energy, he was cofounder and managing director of Barrington Energy Partners, LLC, a strategic consulting firm specializing in energy industry transactions and advisory services. Sarah J. Williams is program coordinator and research associate in the U.S. Nuclear Energy Project at CSIS. Prior to joining CSIS, she was a Herbert Scoville Jr. peace fellow and program coordinator at the Center for Science, Technology and Security Policy at the American Association for the Advancement of Science (AAAS).)

(4/17/12 “Nuclear Energy in America: Preventing its Early Demise” http://csis.org/files/publication/120417\_gf\_wallace\_williams.pdf)

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. Second, spread of SMRs:

**Funding for SMRs now**

HSNW 9/26—Homeland Security News Wire [September 26, 2012, “DOE promotes small-nuclear reactors (SMRs)” http://www.homelandsecuritynewswire.com/dr20120926-doe-promotes-smallnuclear-reactors-smrs]

South Carolina’s Savannah River Site (SRS) located in Aiken, along with the U.S. Department of Energy (DOE), have announced three partnerships to develop three small modular nuclear reactors (SMRs) at the SRS facility; SMRs produce less energy than a regular reactor, but they produce enough energy to power small cities and remote areas

South Carolina’s Savannah River Site (SRS) located in Aiken, along with the U.S. Department of Energy (DOE), have announced three partnerships to develop three small modular nuclear reactors (SMRs) at the SRS facility.

The DOE released a statement saying the agreement “will help leverage Savannah River’s land assets, energy facilities and nuclear expertise to support potential private sector development, testing and licensing of prototype SMR technologies.”

Helen Belecan, DOE’s deputy assistant manager for infrastructure and environmental stewardship at the SRS facility, told Government Technology the goal of the reactors are “to apply the nuclear knowledge and expertise that we have from over 60 years of supporting the nation in its defense-type operation in nuclear material production and help these companies develop the technology and manufacturing capability in the United States so that the United States can take on a leadership role in the manufacturing of these small modular reactors.”

DOE will focus on the advancing SMRs in the United States. $450 million “will be made available to support first-of its kind engineering, design decertification and licensing for up to two SMR designs over five years, subject to congressional appropriations,” DOE says.

Proposals for funding were received in May and are being reviewed to see which proposal will meet the standards of the Nuclear Regulatory Commission (NRC). The DOE plans to announce the recipients later this year.

A SMR is about one-third the size of a regular nuclear reactor and is built at a fraction of the cost. A traditional single-unit nuclear reactor costs roughly $8 billion dollars to build and that number jumps to $14 billion for twin reactors. SMRs produce less energy than a regular reactor, but they produce enough energy to power small cities and remote areas.

Thomas Sander, an associate laboratory director for the Clean Energy Imitative and the Savannah River National Laboratory, told Government Technology the first SMR will cost almost $1 billion, but the price will drop down the line.

“If you are talking about the 100th, my expectation is that cost is going to be reduced significantly as a result of advance factory manufacturing and just a learning process and the licensing process.”

“If you are going after the old coal replacement market, you are looking at 150 to 200 megawatts on average,” Sander said, “but if you are looking at the Alaskan market for small cities or island market or export market for developing countries, you are talking 45 to 100 megawatts.”

The DOE is beginning to sign off on SMR’s for nuclear energy technology, and the government has began to approve projects around the country. DOE spokeswoman Niketa Kumar told Government Technology these new projects will allow the U.S. to compete with other countries in nuclear energy.

**Nat gas isn’t a solvency take out—price rises, diversification, and international demand makes nuclear competitive—prefer SMR specific evidence.**

Lamonica 12—Martin Lamonica is a senior writer covering green tech and cutting-edge technologies [August 9, 2012, “A Glut of Natural Gas Leaves Nuclear Power Stalled,” http://www.technologyreview.com/news/428737/a-glut-of-natural-gas-leaves-nuclear-power/]

Outside the United States, it's a different story. Unconventional sources of natural gas also threaten the expansion of nuclear, although the potential impact is less clear-cut. Around the world, there are 70 plants now under construction, but shale gas also looms as a key factor in planning for the future. Prices for natural gas are already higher in Asia and Europe, and shale gas resources are not as fully developed as they are the United States.

Some countries are also blocking the development of new natural gas resources. France, for instance, which has a strong commitment to nuclear, has banned fracking in shale gas exploration because of concerns over the environmental impact.

Fast-growing China, meanwhile, needs all the energy sources available and is building nuclear power plants as fast as possible.

Even in United States, of course, super cheap natural gas will not last forever. With supply exceeding demand, some drillers are said to be losing money on natural gas, which could push prices back up. Prices will also be pushed upward by utilities, as they come to rely on more natural gas for power generation, says James.

Ali Azad, the chief business development officer at energy company Babcock & Wilcox, thinks the answer is making nuclear power smaller, cheaper, and faster. His is one of a handful of companies developing small modular reactors that can be built in three years, rather than 10 or more, for a fraction of the cost of gigawatt-size reactors. Although this technology is not yet commercially proven, the company has a customer in the Tennessee Valley Authority, which expects to have its first unit online in 2021 (see "A Preassembled Nuclear Reactor").

"When we arrive, we will have a level cost of energy on the grid, which competes favorably with a brand-new combined-cycle natural gas plants when gas prices are between $6 to $8," said Azad. He sees strong demand in power-hungry China and places such as Saudia Arabia, where power is needed for desalination.

Even if natural gas remains cheaper, utilities don't want to find themselves with an overreliance on gas, which has been volatile on price in the past, so nuclear power will still contribute to the energy mix. "[Utilities] still continue [with nuclear] but with a lower level of enthusiasm—it's a hedging strategy," says Hans-Holger Rogner from the Planning and Economics Studies section of the International Atomic Energy Agency. "They don't want to pull all their eggs in one basket because of the new kid on the block called shale gas."

## \*\*\* 2AC

### Solvency

**Massive alternative financing now**

**Loper et al 8** Joe, Vice President for Policy and Research at the Alliance to Save Energy, “Reducing Greenhouse Gas Emissions In Federal Buildings, Facilities and Vehicles”, April, <http://www.climateactionproject.com/docs/PCAP_Final_FEMP_Chapter_4-18-08.pdf>

Appropriations for energy-efficiency improvements historically have been insufficient to exploit more than a small fraction of the energy-saving opportunities in federal facilities.130 In response, EPAct 1992 authorized agencies to upgrade buildings using energy services performance contracts (ESPCs) and utility energy services contracts (UESCs). Under an ESPC, energy service companies (ESCOs) finance and implement energy-saving projects in federal facilities. The ESCO guarantees the savings will be realized. By law, the savings must be at least as great as the contractor payments – if the savings are not realized, the contractor does not get paid. **The contract periods may be up to 25 years, and there is no limit on the amount of investment that can be provided**. UESCs allow electric and gas utilities to provide financing for energy-efficiency projects, as well as offer rebates and technical assistance to federal agencies through their demand-side management programs. Similar to ESPCs, utility investments under UESCs are repaid from the utility bill savings due to the projects. **Agencies have relied heavily on these alternative financing sources**, which have provided funding for nearly half of the federal efficiency investments made since 1985. Of the $6.3 billion invested in energy-efficiency improvements by the federal government since 1985, $3.19 billion has come from appropriations, $1.95 billion has come from ESPCs and $1.16 billion has come from UESCs.131 At their peak a few years ago, ESPCs and UESCs were providing more than $500 million per year for energy-efficiency investments in federal buildings and facilities (Figure 15).132 Cumulative net savings from ESPCs alone are estimated at $1.4 billion, with annual savings of 17.6 trillion Btu,133 equal to about $290 million per year.134 In September 2003, authority to enter into new ESPCs lapsed. This authority was reinstated by Congress in 2004, extended through 2016 in EPAct 2005,135 and made permanent in EISA.136 The use of these financing tools has nearly bounced back to previous levels. While investments in ESPCs and UESCs remained considerably lower in Fiscal Year 2005 than they had been before the authority expired, by Fiscal Year 2006, investments through ESPCs totaled $314 million, while UESCS totaled $70 million. Projections for Fiscal Year 2007 are even higher (Figure 15). The drop off in alternative financing of government efficiency projects in Fiscal Years 2004 and 2005 most likely led to fewer implemented efficiency improvements during those years. The dramatically reduced level of ESPCs corresponds with the authority lapse. The drop-off in UESCs is less clear

**Agencies are already required to maximize it**

**The White House 99** “Executive Order: Greening the Government through Efficient Energy Management”, June 3, <http://wbdg.org/ccb/FED/FMEO/eo13123.pdf>

(a) Financing Mechanisms. Agencies shall maximize their use of available alternative financing contracting mechanisms, including Energy-Savings Performance Contracts and utility energy-efficiency service contracts, when life-cycle cost-effective, to reduce energy use and cost in their facilities and operations. Energy-Savings Performance Contracts, which are authorized under the National Energy Conservation Policy Act, as modified by the Energy Policy Act of 1992, and utility energy-efficiency service contracts provide significant opportunities for making Federal facilities more energy efficient at no net cost to taxpayers.

**We solve without busting the budget**

**Chang et al. 99** [Ike Y. Chang, Steven Galing, Carolyn Wong, Howell Yee, Elliot I. Axelband, Mark Onesi & Kenneth R Horn, “Use of Public-Private Partnerships to Meet Future Army Needs,” Rand Corporation, Prepared for the United States Army by RAND's Arroyo, 1999

Access to Capital

Access to capital often means access to financing. In this case, the money would be used to help finance a collaborative effort. Access to capital is relevant to infrastructure, intellectual property, and financial arrangement PPPs.

The private sector often borrows money to finance its business expenses. Business expenses could include the expansion of a company's infrastructure, the development of intellectual property, or the launching of a new financial arrangement. A firm may enjoy **excellent credit** with one or more financial institutions that can **extend loans** to the company. These factors indicate that the private¶ sector may have access to capital that could be applied toward collaborative efforts that benefit the Army.

The amount the Army can spend on infrastructure is limited each year by its budget. The Army does not borrow money for infrastructure needs. Hence, the Army does not have the experience or the legal authority to access capital beyond its **budgetary constraints**. Therefore, in infrastructure PPPs, the Army should look to its private sector partner for at least some of the collaborative effort funds.

The Army's S&T budget has been decreasing and is likely to continue to decline. In addition, the Army funds its R&D based on the size of its budget. The Army does not borrow money to fund any project beyond what budget funds will provide for, regardless of how advantageous the project may seem. So the Army has **only one source** of R&D funds, and the level of those funds is often **inadequate** to pay for all the research the Army needs to reach its R&D goals. One way for the Army to leverage its R&D dollars is to enter into collaborative efforts with **leading-edge firms** that have access to capital and share¶ in the funding of dual-use research. 5 pg. 14-15

**O&M Budget expense**

**DoD Financial Management Regulation 8** [“SUMMARY OF MAJOR CHANGES TO DOD 7000.14-R, VOLUME 2A, CHAPTER 1,” Volume 2A, Chapter 1, 􀃋October 2008, pg. http://comptroller.defense.gov/fmr/02a/02a\_01.pdf

0102 FUNDING POLICIES

010201. Criteria for Determining Expense and Investment Costs

A. **Appropriation accounts** form the structure for the President’s budget request and are the basis for congressional action. The appropriations are further organized into budget activities of appropriations with programs, projects or activities of similar purposes. To support **management** of the **D**epartment **o**f **D**efense’s programs, projects or activities, resource requirements should be organized and categorized consistently within the appropriation and budget activity structure. The following sections provide guidance for categorizing resource requirements into the various appropriations.

B. Basic Distinctions Between Expense and Investment Costs. The criteria for cost definitions consider the intrinsic or innate qualities of the item such as durability in the case of an investment cost or consumability in the case of an operating cost and the conditional circumstances under which an item is used or the way it is managed. In all cases where the definitions appear to conflict, the conditional circumstances will prevail. The following guidance is provided to determine whether a cost is **either an expense or an investment**. All costs are classified as either an expense or an investment.

1. Expenses are the costs incurred to operate and maintain the organization, such as personal services, supplies, and utilities.

2. Investments are the costs that result in the **acquisition** of, or an addition to, end items. These costs benefit future periods and generally are of a long-term character such as real property and personal property.

C. Policy for Expense and Investment Costs

1. DoD policy requires cost definition criteria that can be used in determining the content of the programs and activities that comprise the Defense budget. The primary reasons for these distinctions are to allow for more **informed resource allocation decisions** and to establish criteria for determining which costs are appropriate to the various defense appropriations.

2. The cost definition criteria contained in this policy are only applicable to the determination of the appropriation to be used for budgeting and execution. Cost definitions for accounting purposes are contained in Volume I of this regulation.

3. Costs budgeted in the Operation and Maintenance (O&M) and Military Personnel appropriations are considered expenses. Costs budgeted in the **Procurement** and Military Construction appropriations are considered investments. Costs budgeted in the Research, Development, Test and Evaluation (RDT&E), Base Realignment and Closure (BRAC), and Family Housing appropriations include both expenses and investments. Pg. 1-13

**Appropriations fail**

**GAO 9** “Defense Infrastructure: DOD Needs to Take Actions to Address Challenges in Meeting Federal Renewable Energy Goals”, December, <http://www.gao.gov/assets/300/299755.html>

According to DOD officials, entering into alternative financing approaches to develop renewable energy projects offers three main advantages to DOD. First, certain **alternative financing approaches may be more cost-effective than DOD-funded and DOD-owned development** of larger renewable energy projects. According to DOD officials, entering into alternative financing approaches to develop renewable energy projects may increase the likelihood of developing these projects on DOD land. This is because private developers have more options than DOD when it comes to obtaining project financing. For instance, developers can sell either the project's energy or renewable energy certificates to a third party, such as the local utility. However, DOD officials stated that DOD cannot make these types of sales. In addition, according to DOD officials, in some cases, **private developers are able to accept renewable energy incentives**, such as tax credits, **that DOD cannot claim**. The second advantage, according to DOD officials, is that the government can realize significant benefits when renewable energy projects are owned by private developers because **the contractor may provide operation and maintenance of the equipment**. For example, officials at an Air Force installation we visited explained that their maintenance staff does not have anyone with the expertise to operate and maintain the installation's renewable projects, and because contractors perform these functions, the installation does not need to hire additional staff to perform these tasks. Finally, although the services use up-front appropriated funding to develop smaller renewable energy projects, DOD officials explained that up-front appropriated funding may be **a poor fit** for developing the larger, higher-cost renewable projects that a key official says are necessary to achieve the renewable energy goals. According to GAO analysis of DOD project data, the services primarily use two types of up-front appropriated funding for smaller renewable projects: the Energy Conservation Investment Program, funded with a military construction account, and the operations and maintenance accounts. Because the total amount of annual Energy Conservation Investment Program funding is divided among the services, officials explained that they are limited in the amount of resources they can commit to a high- cost project from that account. According to DOD, OSD generally grants Energy Conservation Investment Program funding for potential renewable projects based on analysis of the project's life-cycle costs; the less an installation's energy costs, the less likely it may be to receive funding from that account. Because many DOD installations pay low rates for utility-delivered electricity, their proposals for Energy Conservation Investment Program funds to develop renewable projects are often not selected, increasing the challenge DOD faces in funding projects that meet the criteria for funding. According to DOD officials, operations and maintenance funding may also be difficult to use for the development of the large, higher-cost renewable projects that the services plan to develop to meet DOD's renewable energy goals. For instance, according to an Army official, the service considered building a 35-megawatt concentrated solar thermal plant. If completed, this project would be one of the largest on DOD land. According to this official, the Army estimated that the project would require an estimated $1.8 billion in appropriated funding. **Because annual allocations of operations and maintenance funding are typically limited to $750,000 per project**,[Footnote 43] **these funds may not be sufficient** to fund such large, costly projects. Although DOD has developed many small renewable energy projects with upfront appropriated funding, it has relied on alternative financing approaches for its relatively few large renewable energy projects. For example, GAO analysis of DOD data indicates that while the majority--74 percent--of renewable energy projects are funded using up-front appropriations, these projects only generate 13 percent of renewable energy produced on DOD land. In contrast, while only 18 percent of projects are funded using alternative financing, these projects generate the majority--86 percent--of renewable energy produced on DOD land.

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**Solve innovation.**

**Harrison 11** Todd Harrison, Center for Strategic and Budgetary Analysis, 2011, [www.csbaonline.org/wp-content/uploads/2011/07/2011.07.16-FY-2012-Defense-Budget.pdf](http://www.csbaonline.org/wp-content/uploads/2011/07/2011.07.16-FY-2012-Defense-Budget.pdf)

On January 6, 2011, prior to the official release of the FY 2012 budget request, Secretary of Defense Robert Gates announced the results of his efficiency initiative. The initiative, begun nearly a year ago, identified a total of $178 billion in potential savings over five years (FY 2012 to FY 2016), or six percent of the planned funding over that time period. Some $100 billion of the savings came from the Services and the remainder from defense-wide agencies, a government-wide pay freeze that applies to DoD civilians, and revised economic assumptions.3 Several high-profile weapon systems were affected by the announcement, including the Expeditionary Fighting Vehicle (EFV), the Joint Strike Fighter (JSF), and the Surface-Launched Advanced Medium-Range AirtoAir Missile (SLAMRAAM), which are discussed in more detail in Chapter IV of this report. Of the $178 billion in potential savings identified, $78 billion is being used to reduce total defense spending from FY 2012 to FY 2016 compared to what was projected in the FY 2011 FYDP. For example, the effect on the FY 2012 budget is a reduction of $13 billion from the $566 billion in base discretionary budget authority that was previously planned for FY 2012. The remaining $100 billion in potential savings is being reinvested within the defense budget in high-priority programs and activities, such as a new long-range bomber, next-generation jammer, and carrier-based unmanned strike and surveillance aircraft. The **funding for** these **new programs**, however, **could be at risk** in future years if the potential savings identified through the efficiency initiative do not materialize as projected. Previous attempts at achieving similar efficiencies have fallen short of their intended goal. For example, former Secretary of Defense Donald Rumsfeld suggested that DoD could save some $15 billion annually from efficiencies when he took office, roughly 5 percent of the annual budget at the time. But instead of declining, DoD’s peacetime operating costs grew substantially over the years that followed. Current DoD Comptroller Bob Hale wrote in a 2002 report, “After adjusting for changes in force size and inflation, day-to-day operating costs have consistently and persistently increased for decades.” Hale went on to conclude, “These barriers suggest that DoD should be realistic in assessing the prospects for future efficiency savings. The idea that multiple tens of billions of dollars a year can be saved through efficiencies over the next few years—and used to pay for new programs—is almost certainly unrealistic.”4 Unfunded Priori ties Each year, the Services rank and prioritize items for inclusion in the budget request. Unfunded priorities are those items not included in the budget request because they are a lower priority and do not fit within the funding ceiling set for the Department. The Services’ lists of unfunded priorities, sometimes referred to as “wish lists,” are routinely requested by Congress for consideration during their markup of the budget. The total amount of unfunded priorities grew dramatically over the past decade, rising from $9.5 billion in FY 2001 to a peak of $38 billion in FY 2008 (both figures in FY 2012 dollars). In the FY 2010 budget process, Secretary Gates required the Services to present their unfunded priorities to him for review before submitting them to Congress. Unfunded priorities for that year fell by an order of magnitude to just $3.5 billion. In FY 2011 unfunded priorities fell to $1.8 billion, and in FY 2012 they total only $1.2 billion. Nearly all of the unfunded priorities submitted to Congress are in procurement and O&M. This indicates that **if the Services had additional funding available they would prioritize the maintenance of existing equipment** and would procure additional equipment or spares to augment their inventory.

**No green bubble --- energy growth is sustainable**

**Hamilton 12** Tyler, editor-in-chief of Corporate Knights magazine and a business columnist for the Toronto Star, "NO BUBBLE BURSTING FOR CLEAN ENERGY TECHNOLOGIES: THE FUTURE IS GROWTH, GROWTH, GROWTH", August 15, www.energyboom.com/finance/no-bubble-bursting-clean-energy-technologies-future-growth-growth-growth

The reason why clean energy isn’t a fad or a bursting bubble is that global problems such as climate change, pollution, poverty, food scarcity, crumbling legacy infrastructure, and access to clean water aren’t going away anytime soon. Renewable energy and other clean technologies may not be the only solution, but they are a big and growing part of it.¶ Will nuclear help out? Maybe, but don’t count on it. Jeff Immelt, chief executive of General Electric, a big supplier of nuclear technology, told the Financial Times this week that it’s “really hard” these days to justify the cost of nuclear. “I think some combination of gas, and either wind or solar … that’s where we see most countries around the world going.”¶ Ontario may want to reconsider plans for new nukes at Darlington.¶ Fact is, renewable energy costs are falling fast, and that’s part of the reason there are layoffs, profit warnings, bankruptcies and falling share prices in the industry. Subsidies are supposed to gradually fade away, something the fossil fuel industry hasn’t learned after 100 years of handouts.¶ There was oversupply in clean energy equipment. Weak companies are struggling and some are failing. Those intent on surviving figure out how to innovate, adjust, enter new geographic markets and come out stronger – the cycle is not unique to clean energy.¶ “Any emerging market will experience growth problems and will have winners and losers. And the losers’ problems do not necessarily indicate the absence of a long-term market,” says Craig Tighe, a partner with global law firm DLA Piper. “Were that the case, the loss of Palm and Handspring would mean that the smart phone market is not sustainable, which is manifestly not the case.”¶ **Growth in clean energy is happening. What’s changing is the pace of that growth and the players who get to benefit**.¶ **There’s no bubble bursting here**

### 2AC—CP

**SMRs solve blackouts at the Guam base.**

**Baker 12** (Matthew – American Security Project Think Tank, “Do Small Modular Reactors Present a Serious Option for the Military’s Energy Needs?” June 22, 2012, http://americansecurityproject.org/blog/2012/do-small-modular-reactors-present-a-serious-option-for-the-militarys-energy-needs/)

The Defense Energy Security Caucus (DESC) held a briefing yesterday afternoon with proposals to surge the usage of small modular reactors (SMRs). The speakers at the briefing, included Rep. Bartlett (R-MD) and representatives from the American Nuclear Society, recommended that Congress and the White House need to do more “encourage the development and deployment of multiple SMR designs.” SMRs are small, nuclear-powered reactors with power levels less than or equal to 300 MW and the capacity to produce as little as 25MW at a time. SMRs differ from conventional nuclear reactors, which are capable of producing upward of 1,000MW, is that **they are much smaller and cheaper**. That makes them more capable of catering to our modern energy needs. SMRs are able to be constructed in factories, with manufacturing capabilities already available in the United States. Their smaller size means that they require less construction time and can be deployed in areas that cannot accommodate conventional reactors. Although still in the design stage, SMRs could support small townships and military bases once manufactured. The flexibility of the new technology is particularly important to the DESC audience because **SMRs can support remote military bases.** The speakers at the DESC briefing suggested **a surge is needed in SMR production** to combat a major vulnerability in America’s national security: possible attacks to the power grid. Such attacks could cause blackouts **for over a year** according to Congressman Bartlett, **leading to blackouts never before experienced in the U**nited **S**tates. In such an event the U.S. military would still need to function 24/7. Current predictions made by the DESC suggest that up to 90% of the US military’s energy needs could be supplied by SMRs. Congressman Bartlett also pointed out that current military bases such as Guam – which is fueled by the transport of diesel – are extremely vulnerable should the energy transport system be disrupted. Fuel supplies are even more unstable in Afghanistan, where one out of every twenty-four convoys results in a casualty. According to Congressman Bartlett, **SMRs could make such bases energy self-sufficient**.

**Solves a Chinese attack on Taiwan.**

**Caryl 7** (Washington Chief Editor for Radio Free Europe/Radio Liberty. He is a Contributing Editor at Foreign Policy and a Senior Fellow of the Center for International Studies at MIT, <http://www.newsweek.com/2007/02/25/america-s-unsinkable-fleet.html>)

So why all the fuss over a tropical island just 30 miles long, known mainly for its white-sand beaches and glorious sunsets? The answer: the Pentagon has begun a major redeployment of U.S. forces in the region, pulling troops and equipment out of sometimes unreliable allies and beefing up its presence in more-congenial locales. First on its list is Guam, a U.S. territory since 1898 that **is fast becoming the linchpin of Washington's new Asia strategy.** Current U.S. forces on the island number just a few thousand but within a decade will total well over 20,000—about the same size as the Bush administration's planned surge in Iraq. By comparison, there are some 29,000 U.S. troops left in South Korea, yet despite the dangers of a nuclear-armed North, that number is expected to drop significantly. At a time when most of the world's attention is focused on the United States' misadventures in Iraq and Afghanistan, Pentagon planners are quietly working on ways to fortify the U.S. presence in East Asia. And they're looking to do so in ways that will give them a free hand in a wide range of contingencies—including fighting regional terrorists and a possible showdown with China. Guam offers the U.S. military both proximity to potential hot spots and the advantages of operating off U.S. soil. The transfer of forces to the island also reflects the Pentagon's determination to give regional allies such as South Korea and Japan more responsibility for their own security. Guam, a sleepy but diverse place that looks like a cross between Micronesia and Middle America, has long served as a U.S. air base and way station for troops traveling through the Pacific. At the end of the cold war, the Pentagon began shutting down some facilities on the island. But then came September 11, and a dramatic reassessment of America's global forces. Former secretary of Defense Donald Rumsfeld began to advocate the lily-pad strategy: rather than relying on large, static bases in Germany and South Korea, the Pentagon should create a global network of jumping-off points for quick responses to unpredictable attacks. Guam is an **ideal lily pad**, since the United States can act there without seeking permission from allies, says Honolulu-based defense analyst Richard Halloran. Declares Carl Peterson of the Guam Chamber of Commerce: "This is the U.S. in Asia. This is the tip of the spear." The island has already become a convenient base for fighting Washington's "Global War on Terror" in Indonesia and the Philippines. Small wonder that Brig. Gen. Douglas H. Owens, the commanding officer of Guam's Andersen Air Force Base, describes the island as "an unsinkable aircraft carrier." It's also well positioned for possible trouble to come. As Rear Adm. Charles Leidig, U.S. Navy commander on Guam, points out, if you take a map and draw a circle with Guam at the center and a radius of 1,500 nautical miles—equivalent to three hours' flying time or two to three days by ship—you come close to the main islands of Japan, Okinawa, Indonesia and the Philippines. China and the Korean Peninsula are only a bit farther off. So are several of the world's most important sea lanes, such as the Strait of Malacca, through which some 50 percent of the world's oil passes each year. The Pentagon, however, may be building up its forces on Guam with even bigger game in mind. "The larger strategic rationale [for the shift] can be summed up in one word, and that's 'China'," says Halloran. "They [the Bush administration] don't want to contain China, and they couldn't. What they are trying to do is to deter the Chinese. That's what the buildup on Guam is all about." The nature of the U.S. reorganization reinforces this point. Washington and Tokyo have agreed to move 8,000 Marines to Guam from Okinawa by 2014, at a cost of $10 billion (60 percent of which will be paid for by the Japanese government). But this is only the most public part of a broader buildup that has largely escaped notice. If all the pieces come together, it could mean billions more in Defense Department funds and a total increase in Guam's population (which is currently just 170,000) of 35,000. Guam is already home to a major U.S. Navy port and one of the biggest bases in the U.S. Air Force, featuring twin two-mile-long runways. Not long after September 11, flights of massive B-52 bombers began returning to Andersen to carry out regular training missions. Now the Air Force has begun to prepare for the deployment of tanker aircraft and up to 48 fighter planes, including the state-of-the-art F-22 Raptor. Andersen has also already started construction of a $52.8 million project that will house up to 10 Global Hawks--large unmanned spy planes that, according to Pacific Command Air Force Gen. Paul Hester, could end up replacing aging U-2 spy planes now based in South Korea. Meanwhile, the Navy has turned its port at Guam's Apra Harbor into a home for two Los Angeles-class nuclear-powered attack submarines, with a third to come later this year. It also plans to refurbish wharves to accommodate aircraft carriers and to transform Guam into a base for its new Littoral Combat Ship (a shallow-draft stealth ship designed to operate close to shore) and Trident submarines. The Tridents, immense cold-war-era craft converted to fire Tomahawk cruise missiles, can also be used by Navy Special Operations Forces, who can set off on missions in mini-submarines launched through the Tridents' missile ports. Guam is already home to an undisclosed number of Navy SEALs, many of whom have seen duty in the war on terror, and their number will likely grow. Guam's new capabilities, however, are designed for more than just low-intensity conflicts. The attack submarines that will soon be based there, for example, probably wouldn't be much use in a conflict with North Korea or Qaeda-allied terrorists in the Philippines; the presence of the subs, experts say, is clearly aimed at the possibility of a naval confrontation with China over the Taiwan Strait.

### India DA

**There is significant global nuclear growth.**

**Adnani 6/7** (Amir, Founder of Uranium Energy Corp. and has served as the president, CEO and a director since 2005, Under his leadership, Uranium Energy has become North America’s newest uranium-producing company and the first uranium producer in the U.S. in more than seven years. The company has achieved its prime status, including the broad support of major securities analysts and institutional investors, due in large part to Adnani’s early and continuing focus on bringing many of the uranium industry’s most experienced technical personnel into management, *Uranium Investing – Why Nuclear Power Has A Bright Future*, http://oakshirefinancial.com/2012/06/07/uranium-investing-why-nuclear-power-has-a-bright-future/)

If you asked Amir Adnani, chief executive of Uranium Energy Corp., why he was so bullish about uranium in 2007, his answer would be the same as it is today: There is not enough supply to meet demand. Investors might wonder if Fukushima has drawn the curtain on this industry, but Adnani says in this exclusive interview with The Energy Report that this is just the first act for nuclear power. Adnani is taking advantage of what he sees as a once-in-a-lifetime opportunity to grow his Texas-based company, snapping up properties that are now “on sale.”

The Energy Report: More than a year after a tsunami left the Fukushima nuclear reactor in Japan without the ability to sufficiently cool itself, Japan shut down the Tomari 3 nuclear reactor, leaving all 44,200 megawatts (MW) of the country’s nuclear capacity idle with no set date for restart. When investors hear news like that, they might get the impression that nuclear power is a sunset industry. What’s your take?

Amir Adnani: There is no doubt that the nuclear disaster in Japan has been one of the more challenging events facing the industry. Although just a couple weeks after those reactors were taken off-line, a town with two reactors in the western prefecture of Fukui voted in favor of restoring operations. Prime Minister Yoshihiko Noda and the federal government now have to make the final decision and several media outlets are reporting that the government may order the restart of two reactors next week. Many industry observers and analysts are expecting about 20–30 of the reactors to come back on-line over the course of the next year.

Japan is very much dependent on nuclear power. About one-third of Japanese electricity was generated through nuclear power prior to Fukushima. As recently as this February, major industries, like Japan’s steelmakers, have been urging the early restart of nuclear power plants. They fear potential power cuts and the rising costs associated with electricity from fossil fuels could affect their viability. Japan is a major export economy and has very energy-intensive industries to maintain and run competitively. Nuclear power will ultimately, in my opinion, be part of the energy mix in Japan. With time, we’ll see plants come back on-line.

TER: Is that enough to assuage investor concerns? What about what’s happened in Germany, Switzerland and some other European nations that have curtailed energy produced by nuclear reactors?

AA: Certainly investors have sold off uranium holdings based on the situation in Japan and I believe there was both an emotional and political knee-jerk reaction toward the industry. However, if we **take a closer look** at this through a sober vantage point, the effects of Germany phasing its reactors offline by 2022 is not nearly as material as the flip side of it: There remains **significant nuclear growth** in developing markets. Led by China and India, countries like Russia, South Korea and even oil-rich nations like Saudi Arabia and the **U**nited **A**rab **E**mirates are planning to build reactors that would nearly double the world’s installed nuclear capacity by 2030. These countries continue to see nuclear power’s unique ability to generate baseload power in a carbon dioxide-free and low-cost way as a very big advantage in their energy mix.

TER: Where is the growth for nuclear in a post-Fukushima world going to come from?

AA: The growth in the nuclear industry is going to come from exactly where it was going to come from pre-Fukushima. The countries and the economies that are expanding most rapidly are the ones that really need more power. The growth isn’t going to come from the West. In fact, only 3% of the reactors that are under construction right now—there are about 65 reactors under construction—are in G7 countries. The top four markets are China, Russia, India and South Korea. Saudi Arabia plans to build 16 nuclear reactors, which is a $400 billion program. Chinese officials have reiterated the country’s plans to grow its nuclear capacity to about 70 gigawatts (GW) by 2020. India plans to get to about 60–63 GW of installed nuclear capacity by 2030 and it further aims to supply 25% of electricity from nuclear power by 2050.

The plans to develop nuclear power in China and other countries are very much driven by a set of realities that is very different and very acute. People are dying every year in China, literally choking to death, because of all of the nasty toxins that are being put into the environment by burning coal. It takes a lot of infrastructure to get coal into various places in China where some of that infrastructure doesn’t exist yet. No other form of power can match nuclear power’s ability to generate electricity in a low-cost, emission-free manner on a baseload scale.

Having said that, there is incremental growth in the developed world, too. The U.S. Nuclear Regulatory Commission approved four licenses earlier this year for operating nuclear reactors to come on-line in Georgia and South Carolina. They are the first licenses of this type to be issued in the U.S. in almost 30 years. Even in the United Kingdom there have been announcements to build seven or eight new nuclear reactors. It is very positive to see those developments post-Fukushima.

### 2AC—Elections

**Romney will win.**

**WP 10/25** [Chris Cillizza and Aaron Blake, Is Mitt Romney’s momentum real or fake?, <http://www.washingtonpost.com/blogs/the-fix/wp/2012/10/25/is-mitt-romneys-momentum-real-or-fake/>]

Wrote MacGillis regarding the aftermath of Romney’s performance in the first presidential debate on Oct. 3:

“The power of our story bore out across the land. Romney surged in the polls, in a post-debate bounce unlike any ever recorded. Never mind that closer inspection suggested that his rise had begun just before the debate, as Obama’s prior bounce abated. As we like to say in private company, this story was too good to check. We had a comeback on our hands, and as the San Francisco Giants can tell you today, there’s no better story than a comeback.”

So, what does that “closer inspection” reveal? Does it show that Romney genuinely surged in the wake of the first debate or, to MacGillis’s point, does it reveal a media who, like the computer opponent in “Double Dribble,” just likes to keep it close?

MacGillis is absolutely right to note that Obama had begun to fade from what even his staunchest allies acknowledged was an artificial high point in polling at the end of September. A Washington Post/ABC survey released just days before the debate showed the contest at 49 percent for Obama and 47 percent for Romney among likely voters, not exactly a blowout and a statistically insignificant difference from where the race stands — 49 percent Romney, 48 percent Obama — in the latest Post-ABC tracking poll.

But a look at polling in perhaps the three swingiest states in the country — Florida, Ohio and Virginia — suggest that between the first presidential debate and today, there has been a clear trend in Romney’s favor.

In Florida, Romney went from behind by two points on Oct. 3 to ahead by 1.8 points on Wednesday in the Real Clear Politics poll of polls.

In Ohio, Romney went from down 5.5 points on Oct. 3 to down 1.7 points on Wednesday.

And in Virginia, Romney trailed Obama by 3.5 points on Oct. 3 and, as of Wednesday, the two candidates were deadlocked.

Viewed broadly — and with a recognition that a poll of polls is not perfect science — it appears that Romney gained roughly 3.5 points in each of that trio of states over the past 20 days.

That, at least in our book, would suggest that Romney has — or at least had — **some genuine momentum** built off of his strong first debate performance.

But, you could argue, isn’t that “momentum” simply derived — as MacGillis argues — from the media’s decision to flood the zone with coverage of a Romney comeback?

It’s impossible to prove that idea wrong, but to believe in its rightness means that you think the media possesses considerably more power — particularly among low information undecided voters and Republican base voters — than we in fact do. (That’s not to discount the fact that the media does have some power to influence voter perceptions. And, as Jonathan Chait rightly notes in a piece in New York Magazine, the idea that Romney is suddenly and clearly winning the race — and pulling out of North Carolina — is a fallacy that should not be perpetuated by the media.)

But there is a difference between casting Romney as the frontrunner and simply giving Romney his due for a strong debate performance that energized his base and gave independents voters more to like. (In the latest Washington Post-ABC tracking poll released Wednesday, 40 percent of independents said they like Romney more after the debates. Just 10 percent said the same of Obama.)

Now, the question of whether Romney still has the momentum in the race or whether the momentum he enjoyed has subsided is a tough(er) one. Democrats insist Romney has ceased moving up in swing state polling but, even with that admission, they are tacitly acknowledging movement in his direction in recent weeks.

What we do know is that Romney and Obama are in a dead heat nationally and the once-clear edge the incumbent held in a series of swing states has narrowed considerably.

**What we don’t is whether Romney has peaked or** **not**. But it’s tough to argue that there hasn’t been real movement toward him in the past three weeks.

**Zero link --- the plan happens immediately but nuclear plants would not be built till after the election which means no public perception --- AND if their link argument is right Obama would deflect the blame --- PLUS the DOD shields.**

**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

**Neither side will campaign on it**

**Wood 12** (Elisa, "What Obama and Romney Don’t Say About Energy", AOL Energy, 9-13, http://energy.aol.com/2012/09/13/what-obama-and-romney-dont-say-about-energy/)

Fossil fuels and renewable energy have become touchy topics in this election, with challenger Mitt Romney painting President Barack Obama as too hard on the first and too fanciful about the second – and Obama saying Romney is out of touch with energy's future.¶ But two other significant resources, nuclear power and energy efficiency, are evoking scant debate.¶ What gives?¶ Nuclear energy supplies about 20 percent of US electricity, and just 18 months ago dominated the news because of Japan's Fukushima Daiichi disaster – yet neither candidate has said much about it so far on the campaign trail.¶ Romney mentioned nuclear power only seven times in his recently released white paper, while he brought up oil 150 times. Even wind power did better with 10 mentions. He pushes for less regulatory obstruction of new nuclear plants, but says the same about other forms of energy.¶ Obama's campaign website highlights the grants made by his administration to 70 universities for research into nuclear reactor design and safety. But while it is easy to find his ideas on wind, solar, coal, natural gas and oil, it takes a few more clicks to get to nuclear energy.¶ The Nuclear Energy Institute declined to discuss the candidates' positions pre-election. However, NEI's summer newsletter said that both "Obama and Romney support the use of nuclear energy and the development of new reactors."¶ It was unimaginable what hit that plant." - Krueger, Accenture¶ Still, nuclear is unlikely to become a bigger slice of the energy pie in the US over the next two decades because of the high cost to build new plants, according the US Energy Information Administration.¶ **That may explain part of the campaign silence about nuclear**. Another is lingering public worry about Fukushima, say industry observers. Even those who see nuclear as safe, say they understand why the candidates would want to steer clear of the discussion.

**No vote switching --- Romney supports nuclear too.**

**CSM 8/31** (Obama vs. Romney 101: 7 ways they differ on energy issues, <http://www.csmonitor.com/USA/DC-Decoder/2012/0831/Obama-vs.-Romney-101-7-ways-they-differ-on-energy-issues/Coal-power>)

4. Nuclear power The Department of Energy under Obama has provided billions of dollars in federal loan guarantees for nuclear-power development, as well as wind and other "clean" energy sources. In February, the Nuclear Regulatory Commission approved two new reactors at the Vogtle Electric Generating Plant in Georgia, the first such construction approvals in three decades. Obama regularly cites nuclear power development as part of his energy plan. On his website, Romney says he would streamline federal oversight from the Nuclear Regulatory Commission to ensure that licensing decisions for reactors that are on or adjacent to approved sites, and that use approved designs, are completed within two years. He would also expand NRC capabilities for approving additional new nuclear reactor designs. Romney supports federal loan guarantees for nuclear power, a subsidy said to be critical to its development.

**Plan popular --- best polls.**

**Bisconti 12** (Ann Stouffer, President of Bisconti Research, Nationally known expert on public opinion and communications research and has advised many companies and organizations on communications strategies, Member of the American Association of Public Opinion Research, Elected for two terms on the Board of Directors of the American Nuclear Society, Provided consultation on risk communication projects to the American Medical Association, the Electric Power Research Institute, Organization for Economic Co-operation and Development, and the U.S. Environmental Protection Agency, Served on review committees for the Chicago Academy of Sciences, the Edison Electric Institute, the National Science Foundation, the U.S. Department of Energy, and the U.S. Environmental Protection Agency, Attended Harvard University, McGill University, and The Union Institute, *On Nuclear Energy and Public Opinion*, http://neinuclearnotes.blogspot.com/)

Earlier this week, Michael Mariotte of NIRS posted a critique of public opinion polling on nuclear energy over at The Daily Kos. While I found some of his conclusions to be interesting, I thought it might be a good idea to share his piece with Ann Bisconti of Bisconti Research. After passing Mariotte's piece to Ann, she shared the following response with me: A recent discussion about public opinion on nuclear energy by Michael Mariotte, a representative of the antinuclear advocacy group, NIRS, makes some valid points but reaches the wrong conclusion. I would like to offer a different perspective from Bisconti Research. Our studies of public opinion on nuclear energy include nearly 100 national surveys conducted over a 29-year period. Each survey asks 20 to 30 questions about various aspects of public opinion on nuclear energy. Some of these questions are open-ended to let us hear from the public in their own words. The result is a unique resource for examining long-term trends in public opinion, as well as trends among demographic groups. The resource also allows analysis of why people feel the way they do on the issues. Nuclear Energy Institute (NEI) sponsors this survey program. An entire industry depends on this data resource for an accurate and unbiased view of public opinion to inform business decisions. This is a responsibility we take very seriously. Where is Mr. Mariotte correct? We agree that the public prefers solar energy to nuclear energy. That’s been true for at least the past 30 years. Questions that pit nuclear energy against solar energy will find solar energy the “winner” every time. However, what Mr. Mariotte misses is that the public does not want to put all their eggs in one basket. That is prudent. Solar energy, for all its appeal (I would have solar panels on my roof if my house were less shaded), produces just 0.04 percent of U.S. electricity and is not a 24/7 energy source. The prevailing public view is that nuclear energy should be part of a balanced, diverse low-carbon energy mix. Here are a few of the opinions expressed by the public in our February 2012 national public opinion survey conducted with GfK Roper: 81 percent believe that nuclear energy will play an important role in meeting the nation’s future energy needs, 82 percent support license renewal for nuclear power plants that continue to meet federal safety standards, and 58 percent agree with definitely building more nuclear power plants in the future. Also, 82 percent agree we should take advantage of all low-carbon energy sources, including nuclear, hydro, and renewable energy, to produce the electricity we need while limiting greenhouse gas emissions. One reactor provides a lot of power. As Rachel Maddow pointed out, in a recurring spot on MSNBC, some important projects like the Hoover Dam are just too big for private companies to build without government support. Each new reactor now being built in the U.S. will generate twice as much power as the Hoover Dam. Because one new reactor provides so much electricity, new nuclear power plants will not be built in every community. They will be built where they are needed and wanted. The most likely sites are where existing plants are an integral and positive part of the community. Our biennial surveys of nuclear plant neighbors assess that openness to new plants. Last June‘s survey found that 86 percent of nuclear power plant neighbors nationally have a favorable impression of their local plant and how it has operated

**Jobs and gas prices ensure support, nuclear is not an election issue, and Obama supports it now.**

**Johnson 12** (John, Nuclear Energy Insider, April 25, "US Campaign Trail: is nuclear in the equation?", analysis.nuclearenergyinsider.com/new-build/us-campaign-trail-nuclear-equation)

In the next Presidential election, American voters will be voting with their pockets. We look at how the campaign so far has revealed which candidate will support nuclear R&D, nuclear new-build projects and ultimately preserve and create nuclear sector jobs.¶ As the U.S. Presidential election draws closer, Americans are most concerned about job creation and how the candidates plan to boost the U.S. economy.¶ Alternative energy policies have received a fair amount of publicity from the Obama administration, although nuclear power specifically is rarely mentioned on the campaign trial, primarily due to perceived safety questions.¶ Just the same, the Obama Administration is considered a nuclear supporter, having made several moves to help jumpstart America’s nuclear energy industry.¶ Obama plugged nuclear power during his first State Of The Union speech several years ago, and has generally been upbeat about the energy source’s future in the U.S.¶ ¶ The Campaign¶ ¶ Obama, a Democrat, will face Mitt Romney in the November election. Romney is expected to be named the official Republican nominee in August.¶ ¶ While Romney has not taken a stance on nuclear energy during his campaign, the Obama administration has made significant investments in the sector, including a $450m budget request in March intended to advance the development of American-made small modular reactors (SMRs). Congress still needs to approve the authorization for funding.¶ ¶ The SMRs are expected to be ready for commercial use within 10 years, and are intended for small electric grids and for locations that cannot support large reactors, offering utilities the flexibility to scale production as demand changes.¶ ¶ “The Obama Administration and the Energy Department are committed to an all-of-the-above energy strategy that develops every source of American energy, including nuclear power, and strengthens our competitive edge in the global clean energy race,” U.S. Energy Secretary Steven Chu said when the program was announced. ¶ ¶ “Through the funding for small modular nuclear reactors, the Energy Department and private industry are working to position America as the leader in advanced nuclear energy technology and manufacturing.” ¶ ¶ John Keeley, manager of media relations for the Nuclear Energy Institute, said that the Obama administration has done what it can to support the deployment on new build-outs in the United States to build out nuclear, as well as supporting research and development efforts, such as those in the small reactor space. ¶ ¶ Research support¶ ¶ In addition, the U.S. has invested $170 million in research grants at more than 70 universities, supporting research and development into a full spectrum of technologies, from advanced reactor concepts to enhanced safety design.¶ ¶ “The President was explicit in his State Of The Union speech about the virtues of nuclear as a technology and its role in clean air generation,” said Keeley. “And he has been supportive of developing more nuclear plants in this country. Those initiatives have to be identified as significant evidence of support for the nuclear sector.”¶ ¶ There are currently 104 nuclear power reactors operating in the U.S. in 31 states, operated by 30 different utilities. There are four new nuclear reactors being built in the U.S., including two in George at total expected cost of $14bn. ¶ ¶ In another sign of the U.S support for the industry, the federal government provided utility company Southern with an $8.3bn loan guarantee for the Vogtle Units 3 and 4, the first new nuclear plants to be built in the U.S. in the last 30 years. They are expected to be operational in 2016 and 2017.¶ ¶ The U.S. Energy Department has also supported the Vogtle project and the development of the next generation of nuclear reactors by providing more than $200m through a cost-share agreement to support the licensing reviews for the Westinghouse AP1000 reactor design certification. ¶ ¶ In addition to the Vogtle plants, SCANA, a subsidiary of South Carolina Electric & Gas Co. plans to add two reactors to its nuclear power plant near Jenkinsville, S.C., by 2016 and 2019.¶ ¶ “There is certainly political consensus in support of clean generation, and large scale cultural consensus as well,” said Keeley. ¶ ¶ Political benefits of nuclear support¶ ¶ As gas prices in the U.S. continue to soar, it’s possible that the tide will turn more in favor of nuclear and other clean energy sources, especially as electric cars take a stronger foothold. In addition, the job creation benefits from nuclear could work their way into the political landscape as well.¶ ¶ The two new Vogtle nuclear plants are expected.

**No difference between Obama and Romney on foreign policy**

**Miller 12** Aaron Davidscholar at the Woodrow Wilson International Center, “Barack O'Romney”, May 23, http://www.foreignpolicy.com/articles/2012/05/23/barack\_oromney

I raise the idea to drive home a broader point. Despite his campaign rhetoric, Romney would be quite comfortable carrying out President Obama's foreign policy because it accords so closely with his own. And that brings up an extraordinary fact. What has emerged in the second decade after 9/11 is a remarkable consensus among Democrats and Republicans on a core approach to the nation's foreign policy. It's certainly not a perfect alignment. But rarely since the end of the Cold War has there been this **level of consensus.** Indeed, while Americans may be divided, polarized and dysfunctional about issues closer to home, we are really quite united in how we see the world and what we should do about it. Ever wondered why foreign policy hasn't figured all that prominently in the 2012 election campaign? Sure, the country is focused on the economy and domestic priorities. And yes, Obama has so far avoided the kind of foreign-policy disasters that would give the Republicans easy free shots. But there's more to it than that: Romney has had a hard time identifying Obama's foreign-policy vulnerabilities because there's just not that much difference between the two. A post 9/11 consensus is emerging that has bridged the ideological divide of the Bush 43 years. **And it's going to be pretty durable**. Paradoxically, both George W. Bush's successes and failures helped to create this new consensus. His tough and largely successful approach to counterterrorism -- specifically, keeping the homeland safe and keeping al Qaeda and its affiliates at bay through use of special forces, drone attacks, aggressive use of intelligence, and more effective cooperation among agencies now forms a virtually unassailable bipartisan consensus. As shown through his stepped-up drone campaign, Barack Obama has become George W. Bush **on steroids**. And Bush 43's failed policies -- a discretionary war in Iraq and a mismanaged one in Afghanistan -- have had an equally profound effect. These adventures created a counter-reaction against ill-advised military campaigns that is now bipartisan theology as well. To be sure, there are some differences between Romney and Obama. But with the exception of Republicans taking a softer line on Israel and a tougher one on Russia -- both stances that are unlikely to matter much in terms of actual policy implementation -- there's a much greater convergence. Yes, in the interests of winning votes, Romney will hone a few choice attacks in the campaign to come: "The president is weak and an apologizer, I'm not!" "The president doesn't believe in American leadership, I do!" These tropes, however, are either meaningless or inaccurate, and aren't likely to resonate much with a foreign policy-fatigued public.

**China knows its rhetoric.**

**Agency France Press 7/6/12** HEADLINE: China -- again the villain in US election

Top Chinese leaders, increasingly wise to the ways of US politics, are understood to have told Obama that they expect a measure of anti-Beijing rhetoric in the US election. But Beijing seems interested in a return of managed stability after November -- evident in the negotiated exit from a crisis over blind dissident Chen Guangcheng, who took refuge in the US embassy in Beijing. History would suggest things will smooth over next year. For all of Clinton's raging against Beijing for instance, he was the president who steered China into the WTO, doing more than any other leader to assure its rise as an economic superpower. In 2008, candidate Obama said president George W. Bush should boycott the Beijing Olympics. But the next year, President Obama enjoyed a state dinner at the Great Hall of the People in Beijing.

**Romney can’t and won’t bash China.**

**Lee 8/30** (China Matters Staff [Peter Lee, Staying in Character Romney’s China-Bashing, <http://www.counterpunch.org/2012/08/30/romneys-china-bashing/>)

A centerpiece of candidate Romney’s surprisingly insubstantial foreign policy portfolio is China bashing, in the form of the crowd-pleasing assertion that, on Day One of his presidency, he will designate China a “currency manipulator” and instruct the Department of Commerce to impose countervailing duties if Beijing doesn’t behave. [3] This is meant to make a marked contrast with the Obama Treasury Department, which declined to make the currency manipulator designation this year.

As Scott Lincicome, an experienced international trade litigator (and, it might be noted, a libertarian fan of Romney running-mate Paul Ryan’s economic policies) wrote on his blog, **the Romney China plank is pure, election-year BS:///**

Treasury’s assessment must be done in consultation with the IMF [International Monetary Fund] and pursuant to pretty strict guidelines. In short, the president can’t just tell the Treasury to designate a country a “currency manipulator,” and he/she certainly can’t do it publicly via Executive Order (as Romney’s plan promises). To do so would not only violate the letter of the law, but also destroy the Treasury report’s credibility.

Second, the president can’t just instruct the Commerce Department to begin imposing countervailing duties on Chinese goods. Pursuant to US trade law and regulations, the imposition of countervailing duties on imports requires (i) a petition from an affected industry or self-initiation by Commerce …; (ii) preliminary and final findings, based on extensive evidence (including rebuttal from Chinese producers, US importers and the Chinese government) … ; and (iii) preliminary and final findings by the non-partisan International Trade Commission that said imports are injuring the US industry. Each of these steps is required by US law and WTO [World Trade Organization] rules. So Romney’s plan to, on the very first day of his presidency, just start imposing CVDs [countervailing duties] on Chinese imports would be in direct conflict with both US law and the United States’ WTO obligations. [4]

A further difficulty for Romney is that the merits of the case against the PRC as a currency manipulator are becoming rather thin, and serve as a rather poor justification (on grounds of cost-benefit as well as principle) for a session of scorched-earth countervailing duty trade warfare.

China has been quietly appreciating the yuan for several years. Government action, combined with domestic inflation, has led to a 40% appreciation in the yuan since 2005 according to Treasury’s calculation, thereby significantly eroded the export advantages the PRC enjoyed from its undervalued currency. [5]

## \*\*\* 1AR

### 2AC—Top Level

#### SMRs solve nuclear waste.

**Freed 10** (Josh – Director of the Third Way Clean Energy Program, Elizabeth Horwitz – Policy Advisor at Third Way’s Clean Energy Program, Jeremy Ershow – Formerly a Policy Advisor at Third Way, *Thinking Small On Nuclear Power*, September 2010, http://content.thirdway.org/publications/340/Third\_Way\_Idea\_Brief\_-\_Thinking\_Small\_On\_Nuclear\_Power.pdf)

The imperative of creating more diverse clean energy applications has spawned the design of several small reactor technologies which will enable a wide range of new clean energy uses. Known as SMRs, they vary between 1/20th and 1/4th the size of large reactors.8 There are two streams of development on SMRs—those based on the same concept as existing large light water reactors, and advanced reactors of varying design intended to provide new kinds of capabilities.

Light water SMRs have the scale and flexibility to provide a range of amounts of baseload power. They can incrementally expand capacity at an existing power plant or add new capacity at U.S. military installations that need independence from the grid.9 SMRs are financially viable for many utilities, with costs in the hundreds-of-millions of dollars per reactor.10 Because of the power conversion system of these reactors, they can be cost-effectively cooled by air rather than water. As a result, SMRs can supply cheaper baseload clean energy to arid cities in the West, like Denver or Las Vegas.11 And because they can fit into a small structure and be sized to match the capacity of existing electrical infrastructure, SMRs provide a viable path to retrofitting old power plants with clean energy.12

Advanced reactors could open the door to intriguing new possibilities. Some advanced SMRs are being designed to supply heat directly to industrial users, as well as electricity.13 This would enable large manufacturers across industries to replace fossil fuels with clean energy. Micro-reactors could be used in remote locations or under circumstances where a self-sufficient energy source is needed for a limited period of time. Others could **convert existing nuclear waste** into electricity, dramatically reducing problems of waste storage.14

### Solves license

#### solves licensing

(and our gradualism args can be net-benefits)

CSPO 10, Consortium for Science, Policy and Outcomes at ASU, “four policy principles for energy innovation & climate change: a synthesis”, June, <http://www.catf.us/resources/publications/files/Synthesis.pdf>

Government purchase of new technologies is a powerful way to accelerate innovation through increased demand (Principle 3a). We explore how this principle can be applied by considering how the DoD could purchase new nuclear reactor designs to meet electric power needs for DoD bases and operations. Small modular nuclear power reactors (SMRs), which generate less than 300 MW of power (as compared to more typical reactors built in the 1000 MW range) are often listed as a potentially transformative energy technology. While typical traditional large-scale nuclear power plants can cost five to eight billion dollars, smaller nuclear reactors could be developed at smaller scale, thus not presenting a “bet the company” financial risk. SMRs could potentially be mass manufactured as standardized modules and then delivered to sites, which could significantly reduce costs per unit of installed capacity as compared to today’s large scale conventional reactor designs. It is likely that some advanced reactors designs – including molten salt reactors and reactors utilizing thorium fuels – could be developed as SMRs. Each of these designs offers some combination of inherently safe operation, very little nuclear proliferation risk, relatively small nuclear waste management needs, very abundant domestic fuel resources, and high power densities – all of which are desirable attributes for significant expansion of nuclear energy. Currently, several corporations have been developing small nuclear reactors. Table 2 lists several of these companies and their reactor power capacities, as well as an indication of the other types of reactor innovations that are being incorporated into the designs. Some of these technologies depend on the well-established light water reactor, while others use higher energy neutrons, coolants capable of higher temperature operation, and other innovative approaches. Some of these companies, such as NuScale, intend to be able to connect as many as 24 different nuclear modules together to form one larger nuclear power plant. In addition to the different power ranges described in Table 2, these reactors vary greatly in size, some being only 3 to 6 feet on each side, while the NuScale reactor is 60 feet long and 14 feet in diameter. Further, many of these reactors produce significant amounts of high-temperature heat, which can be harnessed for process heating, gas turbine generators, and other operations. One major obstacle is to rapid commercialization and development are prolonged multi-year licensing times with the Nuclear Regulatory Commission. Currently, the NRC will not consider a reactor for licensing unless there is a power utility already prepared to purchase the device. Recent Senate legislation introduced by Senator Jeff Bingaman (D-NM) has pushed for DOE support in bringing down reactor costs and in helping to license and certify two reactor designs with the NRC. Some additional opportunities to facilitate the NRC licensing process for innovative small modular reactors would be to fund NRC to conduct participatory research to get ahead of potential license applications (this might require ~$100million/year) and potentially revise the current requirement that licensing fees cover nearly all NRC licensing review costs. One option for accelerating SMR development and commercialization, would be for DOD to establish SMR procurement specifications (to include cost) and agree to purchase a sufficient amount of SMR’s to underwrite private sector SMR development. Of note here may be that DARPA recently (3/30/10) issued a “Request for Information (RFI) on Deployable Reactor Technologies for Generating Power and Logistic Fuels”2 that specifies may features that would be highly desirable in an advanced commercial SMR. While other specifications including coproduction of mobility fuel are different than those of a commercial SMR power reactor, it is likely that a core reactor design meeting the DARPA inquiry specifications would be adaptable to commercial applications. While nuclear reactors purchased and used by DOD are potentially exempt from many NRC licensing requirements3, any reactor design resulting from a DOD procurement contract would need to proceed through NRC licensing before it could be commercially offered. Successful use of procured SMR’s for DOD purposes could provide the knowledge and operational experience needed to aid NRC licensing and it might be possible for the SMR contractor to begin licensing at some point in the SMR development process4. Potential purchase of small modular nuclear reactors would be a powerful but proven way in which government procurement of new energy technologies could encourage innovation. Public procurement of other renewable energy technologies could be similarly important.

### AT: Makhijani Ev

**Their evidence is wrong.**

**Barton 10** Charles, frmr PhD Candidate in History, MA in Philsophy, worked on the LFTR concept for about 2/3eds of his ORNL career and recognized by nuclear bloggers most of whom have technical training, and has been mentioned by the Wall Street Journal, “Arjun Makhijani and the Modular Small Reactor null-hypothesis” October 2, 2010, http://nucleargreen.blogspot.com/2010/10/arjun-makhijani-and-modular-small.html)

Arjun Makhijani (with Michele Boyd) has recently published a fact sheet on Small Modular Reactors which in effect advertises itself as the null-hypothesis to the case I an others have been making for some time on the advantages of small reactors. Small Modular ReactorsNo Solution for the Cost, Safety, and Waste Problems of Nuclear Power, Makhijani's title proclaims. But what is the evidence that backs Makhijani's case up. As it turns out Makhijani offers no empirical data to back up his assertion, so as an example of scientific reasoning, Makhijani's fact sheet rates an F.

### AT: NG

**Nat gas isn’t a solvency take out—price rises, diversification, and international demand makes nuclear competitive—prefer SMR specific evidence.**

Lamonica 12—Martin Lamonica is a senior writer covering green tech and cutting-edge technologies [August 9, 2012, “A Glut of Natural Gas Leaves Nuclear Power Stalled,” http://www.technologyreview.com/news/428737/a-glut-of-natural-gas-leaves-nuclear-power/]

Outside the United States, it's a different story. Unconventional sources of natural gas also threaten the expansion of nuclear, although the potential impact is less clear-cut. Around the world, there are 70 plants now under construction, but shale gas also looms as a key factor in planning for the future. Prices for natural gas are already higher in Asia and Europe, and shale gas resources are not as fully developed as they are the United States.

Some countries are also blocking the development of new natural gas resources. France, for instance, which has a strong commitment to nuclear, has banned fracking in shale gas exploration because of concerns over the environmental impact.

Fast-growing China, meanwhile, needs all the energy sources available and is building nuclear power plants as fast as possible.

Even in United States, of course, super cheap natural gas will not last forever. With supply exceeding demand, some drillers are said to be losing money on natural gas, which could push prices back up. Prices will also be pushed upward by utilities, as they come to rely on more natural gas for power generation, says James.

Ali Azad, the chief business development officer at energy company Babcock & Wilcox, thinks the answer is making nuclear power smaller, cheaper, and faster. His is one of a handful of companies developing small modular reactors that can be built in three years, rather than 10 or more, for a fraction of the cost of gigawatt-size reactors. Although this technology is not yet commercially proven, the company has a customer in the Tennessee Valley Authority, which expects to have its first unit online in 2021 (see "A Preassembled Nuclear Reactor").

"When we arrive, we will have a level cost of energy on the grid, which competes favorably with a brand-new combined-cycle natural gas plants when gas prices are between $6 to $8," said Azad. He sees strong demand in power-hungry China and places such as Saudia Arabia, where power is needed for desalination.

Even if natural gas remains cheaper, utilities don't want to find themselves with an overreliance on gas, which has been volatile on price in the past, so nuclear power will still contribute to the energy mix. "[Utilities] still continue [with nuclear] but with a lower level of enthusiasm—it's a hedging strategy," says Hans-Holger Rogner from the Planning and Economics Studies section of the International Atomic Energy Agency. "They don't want to pull all their eggs in one basket because of the new kid on the block called shale gas."

### AT Bostrom

#### Bostrom concludes US/Russia war not cause extinction.

Nick **Bostrom**, **2007** Oxford Future of Humanity Institute, Faculty of Philosophy & James Martin 21st Century School. “The Future of Humanity,” New Waves in Philosophy of Technology, <http://www.nickbostrom.com/>.

Extinction risks constitute an especially severe subset of what could go badly wrong for humanity. There are many possible global catastrophes that would cause immense worldwide damage, maybe even the collapse of modern civilization, yet fall short of terminating the human species. An all-out nuclear war between Russia and the United States might be an example of a global catastrophe that **would be unlikely to result in extinction**. A terrible pandemic with high virulence and 100% mortality rate among infected individuals might be another example: if some groups of humans could successfully quarantine themselves before being exposed, human extinction could be avoided even if, say, 95% or more of the world’s population succumbed. What distinguishes extinction and other existential catastrophes is that a comeback is impossible. A non-existential disaster causing the breakdown of global civilization is, from the perspective of humanity as a whole, a potentially recoverable setback: a giant massacre for man, a small misstep for mankind.

### US-Russia War

#### No risk of U.S.-Russian war – Russia knows the U.S. is infinitely more powerful and that it couldn’t be a threat.

**Bandow 08** (Doug, former senior fellow at the Cato Institute and former columnist with Copley News Service, 3/“Turning China into the Next Big Enemy.” http://www.antiwar.com/bandow/?articleid=12472)

In fact, America remains a military colossus. The Bush administration has proposed spending $515 billion next year on the military; more, adjusted for inflation, than at any time since World War II. The U.S. accounts for roughly half of the world's military outlays. Washington is allied with every major industrialized state except China and Russia. America's avowed enemies are a pitiful few: Burma, Cuba, Syria, Venezuela, Iran, North Korea. The U.S. government could destroy every one of these states with a flick of the president's wrist. Russia has become rather contentious of late, but that hardly makes it an enemy. Moreover, the idea that Moscow could rearm, reconquer the nations that once were part of the Soviet Union or communist satellites, overrun Western Europe, and then attack the U.S. – without anyone in America noticing the threat along the way – is, well, a paranoid fantasy more extreme than the usual science fiction plot. The Leninist Humpty-Dumpty has fallen off the wall and even a bunch of former KGB agents aren't going to be able to put him back together.

#### No impact. Incentives for cooperation overwhelm confrontation.

**Markedonov ‘9** (Sergei, Heads the Dept. of Interethnic Problems – Institute of Political and Military Analysis (Moscow), Russian Politics and Law, “The ‘Five-Dya War’ Preliminary Results and Consequences” 47:3, May-June)

Paradoxical as it may sound, the NATO bloc took much more constructive and cautious approaches (than the United States) toward Russia. Recent events have shown that we should not identify the North Atlantic alliance with the United States. All the declarations made by NATO Secretary-General Jaap de Hoop Scheffer and NATO spokesman James Appathurai were much more politically correct than the arguments prepared by representatives of the U.S. State Department. For the sake of comparison, I provide here just two examples. During a visit to Tbilisi on 16 September, the NATO secretary-general declared that it was not part of his organization’s brief “to judge Russia.” At the same time, Matthew Bryza, U.S. deputy assistant secretary of state [for European and Eurasian affairs] (the desk officer in charge of the current administration’s Caucasus policy) proposed to stop cooperating with Russia regarding the Karabakh settlement through the OSCE Minsk Group until the Medvedev–Sarkozy plan was completely implemented. Meanwhile, the Russian propaganda machine, ignoring the positive messages from NATO (for instance, its position on Afghanistan), identified the position of the entire bloc (far from pro-Russian but not so unambiguous as the American approach) with the views held by U.S. leaders. In general, in August–September 2008 Russian diplomats and politicians, instead of focusing on “dividing the West,” became carried away by demonizing it, which objectively helped Mikheil Saakashvili by distracting the attention of European politicians from the aggressive ambitions of the Georgian president. In any case, the conventional “West” (personified by various countries, blocs, and structures) is not ready for a new “cold war” against Russia. Moreover, if the South Caucasus is recognized as a zone of Moscow’s “special interests” (motivated, above all, by the security problems in the Russian South), our country would reduce its anti-Westernism, which is currently in demand. Today, a new “cold war” is not possible. That is another result of “hot August.” Between the Russian Federation and the West, there are no ideological differences: Moscow was not exporting socialism to South Ossetia and Abkhazia and was not defending anybody’s dynastic interests there. Of course, there are essential differences in the interpretation of national interests, and some stereotypes and phobias of the past still persist. There are, however, much more serious challenges than these: the situation in Afghanistan and Central Asia, the problems of Iran and North Korea, energy, and international terrorism, which require joint efforts and in principle cannot be resolved without mutual participation. All this gives us hopes, albeit weak, that a search for general rules governing the world order will soon begin.

### AT Russia Strikes

#### Russia are nationalists, not suicidal. Won't escalate border conflicts.

**Bandow, ‘10**  (Doug, Senior Fellow – Cato, Huffington Post, “China: The Next “Necessary” Enemy?” 1-3, http://www.huffingtonpost.com/doug-bandow/china-the-next-necessary\_b\_443349.html)

What else is there? Russia is the enemy du jour for some, but Moscow today is a pale imitation of Moscow during the Cold War. The Soviet Union has been dismantled; its constituent states have seceded and shifted westward in orientation; the European Union alone has more than ten times Russia's GDP and spends more than Moscow on the military. Most important, though Vladimir Putin's Russia has taken a nasty authoritarian turn and exhibits near paranoid concern about the security of its border, world domination is no longer on Moscow's agenda. Even the most nationalistic Russian is not suicidal, and initiating war against America would be suicidal.

### No Vote Switch

#### Both Obama and Romney support nuclear.

Clayton 12—[Mark Clayton, CSM Staff writer, “Obama vs. Romney 101: 7 ways they differ on energy issues,” http://www.csmonitor.com/USA/DC-Decoder/2012/0831/Obama-vs.-Romney-101-7-ways-they-differ-on-energy-issues/Nuclear-power]

4. Nuclear power

The Department of Energy under Obama has provided billions of dollars in federal loan guarantees for nuclear-power development, as well as wind and other "clean" energy sources. In February, the Nuclear Regulatory Commission approved two new reactors at the Vogtle Electric Generating Plant in Georgia, the first such construction approvals in three decades. Obama regularly cites nuclear power development as part of his energy plan.

On his website, Romney says he would streamline federal oversight from the Nuclear Regulatory Commission to ensure that licensing decisions for reactors that are on or adjacent to approved sites, and that use approved designs, are completed within two years. He would also expand NRC capabilities for approving additional new nuclear reactor designs. Romney supports federal loan guarantees for nuclear power, a subsidy said to be critical to its development.