### Plan

#### The United States Department of Defense should procure small modular reactors for use on military bases within the United States.

### Islanding

#### Grid disruptions are inevitable - only SMR’s can solve**Robitaille 12**

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

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

#### Disruptions cause nuclear lashout – SMRs solve but renewables fail

Andres and Breetz 11

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Grid Vulnerability**. DOD is unable to provide its ¶ bases with electricity when the civilian electrical grid is ¶ offline for an extended period of time**. Currently, domestic military installations receive 99 percent of their ¶ electricity from the civilian power grid. As explained in a ¶ recent study from the Defense Science Board:¶ DOD’s key problem with electricity is **that** critical ¶ missions, such as national strategic awareness and ¶ national command authorities, are **almost entirely ¶** dependent on the **national transmission** grid. . . ¶ **[which] is fragile, vulnerable, near its capacity ¶ limit, and outside of DOD control**. In most cases, ¶ **neither the grid nor on-base backup power provides¶ sufficient reliability to ensure continuity of critical ¶ national priority functions and oversight of ¶ strategic missions in the face of** a long term (several ¶ months) **outage**.¶ 7¶ The grid’s fragility was demonstrated during the 2003 ¶ Northeast blackout in which 50 million people in the ¶ United States and Canada lost power, some for up to a ¶ week, when one Ohio utility failed to properly trim trees. ¶ The blackout created cascading disruptions in sewage ¶ systems, gas station pumping, cellular communications, ¶ border check systems, and so forth, and demonstrated the ¶ interdependence of modern infrastructural systems.¶ 8¶ More recently, awareness has been growing that ¶ **the grid is also vulnerable to purposive attacks**. A report sponsored by the Department of Homeland Security suggests **that a coordinated cyberattack on the grid ¶ could result in a third of the country losing power for ¶ a period of weeks or months**.¶ 9¶ Cyberattacks on critical ¶ infrastructure are not well understood. It is not clear, for ¶ instance, whether existing terrorist groups might be able ¶ to develop the capability to conduct this type of attack. **It ¶ is likely, however, that some nation-states either have or ¶ are working on developing the ability to take down the ¶ U.S. grid**. **In the event of a war** with one of these states, ¶ it is possible, if not likely, that **parts of the civilian grid ¶ would cease to function, taking with them military bases ¶ located in affected regions.**¶ Government and private organizations are currently ¶ working to secure the grid against attacks; however, it is ¶ not clear that they will be successful. Most military bases ¶ currently have backup power that allows them to function for a period of hours or, at most, a few days on their ¶ own. If power were not restored after this amount of time, ¶ the results could be disastrous. First, military assets taken ¶ offline by the crisis would not be available to help with disaster relief. Second, **during an extended blackout, global ¶ military operations could be seriously compromised; this ¶ disruption would be particularly serious if the blackout ¶ was induced during major combat operations.** During the ¶ Cold War, this type of event was far less likely because the United States and Soviet Union shared the common understanding that blinding an opponent with a grid blackout could escalate to nuclear war. America’s current opponents, however, may not share this fear or be deterred ¶ by this possibility.¶ In 2008, the Defense Science Board stressed that ¶ DOD should mitigate the electrical grid’s vulnerabilities by turning military installations into “islands” of ¶ energy self-sufficiency.¶ 10¶ **The department has made efforts to do so by promoting efficiency programs** that ¶ lower power consumption on bases and by constructing ¶ renewable power generation facilities on selected bases. ¶ Unfortunately, these programs **will not come close to ¶** reaching the goal of **islanding** thevast majority of bases**. ¶ Even with** massive investment in efficiency and **renewables,** most **bases would not** be able to **function for more ¶ than a few days after the** civilian **grid went offline**. **Unlike other alternative sources of energy, small reactors have the potential to solve DOD’s vulnerability to ¶ grid outages.** **Most bases have relatively light power demands when compared to civilian towns or cities. Small ¶ reactors could easily support bases’ power demands separate from the civilian grid during crises**. In some cases, ¶ the reactors could be designed to produce enough power ¶ not only to supply the base, but also to provide critical ¶ services in surrounding towns during long-term outages.¶ Strategically, islanding bases with small reactors ¶ has another benefit. **One of the main reasons an enemy ¶ might be willing to risk reprisals by taking down the ¶ U.S. grid during a period of military hostilities would ¶ be to affect ongoing military operations. Without the ¶ lifeline of intelligence, communication, and logistics ¶ provided by U.S. domestic bases, American military operations would be compromised in almost any conceivable contingency. Making bases more resilient to ¶ civilian power outages would reduce the incentive for ¶ an opponent to attack the grid.** An opponent might ¶ still attempt to take down the grid for the sake of disrupting civilian systems, but **the powerful incentive to ¶ do so in order to win an ongoing battle or war would ¶ be greatly reduced.**

#### Grid failures risks terrorism

Defense Science Board 8

(The DSB is a Federal ¶ Advisory Committee established to provide independent advice to the Secretary of ¶ Defense, “More Fight – Less Fuel” <http://www.acq.osd.mil/dsb/reports/ADA477619.pdf>, SEH)

**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.** About 85% of the energy infrastructure upon which DoD ¶ depends is commercially owned, **and 99% of the electrical energy DoD installations ¶ consume originates outside the fence.¶** 3¶ As noted below, however, the grid 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. ¶ 2.3.1 State of the Grid ¶ The U.S.-Canadian electric grid is very efficient and cost effective but its design metric ¶ is efficiency more than resiliency. As a consequence, it is vulnerable to natural disaster or deliberate attack. The Task Force received several briefings from the Mission ¶ Assurance Division at Dahlgren (MAD), the Department of Energy and the utility ¶ industry. Based on these briefings, the Task Force is concerned about the condition of ¶ the grid and the ability to effect timely repairs. ¶ This concern extends not only to the complete dependency of critical national security ¶ missions on the grid, but also to its centrality to all facets of the nation’s economic life. ¶ To appreciate the seriousness of the impacts of an extended disruption, consider the ¶ 2003 Northeast blackout. At around 4:15pm EST on August 14, 2003 about 50 million ¶ people living in a 9,300 square mile area in the U.S. and Canada lost electrical power. ¶ More than 500 generating units at 265 power plants shut down during the outage, 22 of ¶ which were nuclear. Those plants took about two weeks to regain full capacity, and lost ¶ an average of more than half their capacity for 12 days. The shutdown was in part ¶ precautionary in nature. If an imbalance between load and supply occurs, power lines ¶ grow longer and sag from overheating and other hardware can fail. These imbalances ¶ can damage equipment that is hard-to-repair, requires long lead time to produce and is ¶ expensive. So, the grid quickly disconnects itself when a threatening imbalance is ¶ detected. Nuclear plants are required for safety reasons to shut down when the grid ¶ they’re connected to is de-energized.¶ 4¶ A U.S.-Canada Task Force found the main cause of the blackout to be the failure of a ¶ utility in Ohio to properly trim trees near a power line, causing the first in what became a ¶ set of cascading failures.¶ 5¶ Secretary of Energy Spencer Abraham said there would be ¶ no punishment for the utility because current U.S. law does not require electric reliability ¶ standards. However, the Energy Policy Act of 2005 (EPAct 2005) gave the Federal ¶ Energy Regulatory Commission (FERC) new authority to direct the industry to develop ¶ reliability standards. It directs FERC to designate an Electric Reliability Organization ¶ (ERO) to develop and propose reliability standards, which only after agreement by the ¶ industry become mandatory. The ERO chosen by the FERC is a volunteer, industry run ¶ organization. While FERC oversight of industry developed standards is an ¶ improvement over the previous situation, the Task Force remains concerned that FERC ¶ may be unable to reduce the risk to critical DoD missions to acceptable levels in a ¶ reasonable timeframe. ¶ **Some have argued that the August 2003 incident shows that the protections built into ¶ the grid worked. Within several hours electricity was restored to many areas, though a ¶ few areas waited nearly a week. However, the incident highlights how easily the power ¶ grid could be taken down. Also, quick restoration was possible because no significant ¶ equipment was damaged, something that might not occur in future incidents**. **Further, ¶ during the blackout most systems failed that would detect unauthorized border ¶ crossings, port landings, or unauthorized access to vulnerable sites. Future such blackouts could be exploited for terrorist activity, with potentially far more catastrophic ¶ results**. ¶ These risks exist elsewhere than in the U.S. For example, on September 28, 2003 Italy ¶ experienced the largest of a series of blackouts suffered through that year, affecting a ¶ total of 56 million people, and spilling into Switzerland.¶ 6¶ It was also the most serious ¶ blackout in Italy in 20 years. DoD installations located outside the continental United ¶ States (OCONUS) are dependent on the commercial grids serving their locations. ¶ Security of their power supplies and continuation of their missions is as important as ¶ within the U.S.

#### Numerous attempts prove our impact

Wagner 9/11

(Dr. Abraham R. Wagner is a Professor of International and Public Affairs at the ¶ Arnold A. Saltzman Institute of War & Peace Studies at Columbia University. “Counter-Terrorism Technologies -- Taking Stock on 9/11” 09/11/2012 2:13 pm accessed online September 11, 2012 at <http://www.huffingtonpost.com/abraham-r-wagner/counterterrorism-technolo_b_1874521.html>, TSW)

On this 11th anniversary of the 9/11 attacks, it makes sense to take stock of where the nation has progressed in its effort to deter and combat future terrorist attacks, both at home and abroad. The **9/11 attacks came** as a shock, and **have** rightfully **come** **to be regarded as a major U.S. intelligence failure**. **In the aftermath**, **the nation undertook significant organizational reforms designed to enable more effective intelligence** and law enforcement operations against evolving terrorist threats. **The** **country also looked to see what science, engineering and technology could do to help addresses these threats**.¶ Technology has long been the nation's strong suit. Americans tend to believe that where there is a problem, there must certainly be a solution and it most likely involves technology and money. **During the decade that followed 9/11, billions of dollars were spent on a vast range of programs and technologies in the name of counter-terrorism**. For the first two years after 9/11, I joined with other scientists and engineers at the Department of Defense and the Intelligence Community in efforts to identify the most promising approaches to the problem. Ultimately we found that there was no magic bullet or perfect solution to this thorny problem, but were able to suggest a range of investments that could be made to address the evolving terrorist threat.¶ An honest assessment of these investments in counter-terrorism technologies reveals that the results have been mixed -- as one might well expect. A combination of **greatly improved intelligence** and law enforcement personnel have **employed some of the better technologies with considerable success**. Indeed, some **45 terrorist plots have been stopped** and others deterred. How much of **this has been** simply luck and how much can be traced to any **new technology program** is a matter of debate, and there are **clearl**y **examples** of both that **can be found.**¶ **One area where technology has made a significant contribution has been in new systems to aid in intelligence and surveillance against terrorist operations.** While terrorists may hold to an eighth century ideology, they have not been reluctant to employ 21st century communications and information technologies. They have utilized the Internet and cell phones for a number of purposes, and at the time of 9/11 the nation was in need of systems to intercept and sort out terrorist communications. While highly sensitive, public disclosures about several key programs show that considerable progress has been made in this critical area, giving the intelligence agencies some key tools in locating terrorists and stopping their plots. Aside from communications intercept, a new area of "data mining" has also shown considerable promise in locating terrorists and their plots.¶ At the same time, several of key surveillance programs used for counter-terrorism have come under fire from civil liberties groups as being unconstitutional violations of the Fourth Amendment privacy protections, and others. Critics of the Bush Administration saw this as "running roughshod over the Constitution." Even now there are still federal court challenges to laws such as the 2008 FISA Amendments Act and others that have enabled counter-terrorist efforts since 9/11. Ultimately a balance needs to be struck between the essential needs for intelligence to thwart future attacks and protected privacy rights, but as yet it remains an unsettled area where the Supreme Court will need to rule at some future point in time.¶ Less controversial have been efforts over the past decade to employ new information technologies to what has been termed the Information Sharing Environment -- collaborative efforts to best utilize available intelligence and other data among the various federal, state and local agencies with counter-terrorism responsibilities. While certainly some progress has been made over the past 11 years, the net result is largely a national embarrassment, and clearly a triumph of politics over physics. The information and communications technologies are all well-developed, but multiple bureaucracies have generated a set of plans and an even larger set of excuses as to why the fundamental problems in this area remain to be solved.

#### Terrorists are targeting Syrian bioweapons now and will use them

Blair ‘12

(Charles P. Blair joined FAS in June 2010. He is the Senior Fellow on State and Non-State Threats. Born and raised in Los Alamos, New Mexico, Mr. Blair was an exchange student in Moscow in the mid-1980s, witnessing firsthand the closing salvos of the Cold War. Since the end of that era, Mr. Blair has worked on issues relating to the diffusion and diversification of weapons of mass destruction (WMD) in the context of proliferation amid the rise of mass casualty terrorism incidents and the centripetal and centrifugal elements of globalization. Mr. Blair’s work focuses on state and violent non-state actors (VNSA) – amid a dystopic and increasingly tribal world. “Fearful of a nuclear Iran? The real WMD nightmare is Syria” 1 MARCH 2012 accessed online August 22, 2012 at http://www.thebulletin.org/web-edition/op-eds/fearful-of-nuclear-iran-the-real-wmd-nightmare-syria)

As possible military action against Iran's suspected nuclear weapons program looms large in the public arena, far **more international concern should be directed toward Syria and its weapons of mass destruction.** When the Syrian uprising began more than a year ago, few predicted the regime of President Bashar al-Assad would ever teeter toward collapse. Now, though, **the demise of Damascus's** current **leadership** **appears inevitable**, **and Syria's revolution will likely be an unpredictable**, protracted, and grim affair. **Some see similarities with Libya's civil wa**r, **during which persistent fears revolved around terrorist seizure of Libyan chemical weapons**, or the Qaddafi regime's use of them against insurgents. **Those fears turned out to be unfounded**.¶ **But the Libyan chemical stockpile consisted of several tons of aging mustard gas** leaking from a half-dozen canisters **that would have been impossible to utilize as weapons**. **Syria** likely **has one of the largest and most sophisticated chemical weapon programs in the world**. Moreover, **Syria may also possess an offensive biol**ogical **weapons capability that Libya did not**.¶ While it is uncertain whether the Syrian regime would consider using WMD against its domestic opponents, Syrianinsurgents, unlike many of their Libyan counterparts, are increasingly sectarian and radicalized; indeed, many observers fear the uprising is being "hijacked" by jihadists. **Terrorist groups active in the Syrian uprising have already demonstrated little compunction about the acquisition and use of WMD**. In short, should Syria devolve into full-blown civil-war, **the security of** **its WMD should be of profound concern**, as sectarian insurgents and Islamist terrorist groups may **stand poised** **to seize** chemical and perhaps even **bio**logical **weapons.**¶ An enormous unconventional arsenal. Syria's chemical weapons stockpile is thought to be massive. One of only eight nations that is not a member of the Chemical Weapons Convention -- an arms control agreement that outlaws the production, possession, and use of chemical weapons -- Syria has a chemical arsenal that includes several hundred tons of blistering agents along with likely large stockpiles of deadly nerve agents, including VX, the most toxic of all chemical weapons. At least four large chemical weapon production facilities exist. Additionally, Syria likely stores its deadly chemical weapons at dozens of facilities throughout the fractious country. In contrast to Libya's unusable chemical stockpile, analysts emphasize that **Syrian** chemical **agents** **are weaponized and deliverable**. Insurgents and **terrorists** with past or present connections to the military **might feasibly be able to effectively disseminate** chemical **agents over large populations**. (The Global Security Newswire recently asserted that "[t]he Assad regime is thought to possess between 100 and 200 Scud missiles carrying warheads loaded with sarin nerve agent. The government is also believed to have several hundred tons of sarin agent and mustard gas stockpiled that could be used in air-dropped bombs and artillery shells, according to information compiled by the James Martin Center.")¶ Given its robust chemical weapons arsenal and its perceived need to deter Israel, **Syria has** long been suspected of having **an active biological weapons program**. Despite signing the Biological Weapons and Toxins Convention in 1972 (the treaty prohibits the development, production, and stockpiling of biological and toxin weapons), Syria never ratified the treaty. Some experts contend that any Syrian biological weapons program has not moved beyond the research and development phase. Still, **Syria's biotechnical infrastructure undoubtedly has the capability to develop numerous biological weapon agents**. After Israel destroyed a clandestine Syrian nuclear reactor in September 2007, Damascus may have accelerated its chemical and biological weapons programs.¶ **It's hard to guard WMD when a government collapses**. **Although the U**nited **S**tates and its allies **are** reportedly **monitoring** **Syria's** chemical **weapons**, **recent history warns that securing them from theft or transfer is an extraordinary challenge**. For example, during Operation Iraqi Freedom, more than 330 metric tons of military-grade high explosives vanished from Iraq's Al-Qaqaa military installation. Almost 200 tons of the most powerful of Iraq's high-explosives, HMX -- used by some states to detonate nuclear weapons -- was under International Atomic Energy Agency seal. Many tons of Al-Qaqaa's sealed HMX reportedly went missing in the early days of the war in Iraq. Forensic tests later revealed that some of these military-grade explosives were subsequently employed against US and coalition forces.¶ Even with a nationwide presence of 200,000 coalition troops, several other sensitive military sites were also looted, including Iraq's main nuclear complex, Tuwaitha. Should centralized authority crumble in Syria, it seems highly unlikely that the country's 50 chemical storage and manufacturing facilities -- and, possibly, biological weapon repositories -- can be secured. The US Defense Department recently estimated that it would take more than 75,000 US military personnel to guard Syria's chemical weapons. This is, of course, if they could arrive before any WMD were transferred or looted -- a highly unlikely prospect.¶ Complicating any efforts to secure Syria's WMD, post-Assad, are its porous borders. **With Syria's government distracted by internal revolt and US forces now fully out of Iraq**, **it is plausible that stolen** chemical or **bio**logical **weapons** **could find their way across the Syrian border** **into Iraq**. Similarly, Syrian WMD could be smuggled into southern Turkey, Jordan, Lebanon, the West Bank, Israel, and, potentially, the United States and Europe.¶ **At least six formal terrorist organizations have long maintained personnel within Syria.** **Three of these groups** -- **Hamas, Hizbollah, and Palestinian Islamic Jihad** -- **have already attempted to acquire** or use chemical or **biological agents**, or both. Perhaps more troubling, **Al Qaeda-affiliated fighters from Iraq have streamed into Syria**, acting, in part, on orders from Al Qaeda leader Ayman al-Zawahiri. In the past, Al Qaeda-in-Iraq fighters attempted to use chemical weapons, most notably attacks that sought to release large clouds of chlorine gas. The entry of Al Qaeda and other jihadist groups into the Syrian crisis underscores its increasingly sectarian manifestation. Nearly 40 percent of Syria's population consists of members of minority communities. Syria's ruling Alawite regime, a branch of Shia Islam, is considered heretical by many of Syria's majority Sunni Muslims -- even those who are not jihadists. Alawites, Druze, Kurds, and Christians could all become targets for WMD-armed Sunni jihadists. Similarly, Shiite radicals could conceivably employ WMD agents against Syria's Sunnis.¶ Religious fanaticism and WMD. Evidence of growing religious fanaticism is also reflected in recent Syrian suicide attacks. Since last December, at least five suicide attacks occurred in Syria. In the 40 years preceding, only two suicide attacks were recorded. Al Qaeda-linked mujahidin are believed to be responsible for all of these recent attacks. Civil wars are often the most violent and unpredictable manifestations of war. With expanding sectarian divisions, the use of seized WMD in Syria's uprising is plausible. To the extent that religious extremists believe that they are doing God's bidding, fundamentally any action they undertake is justified, no matter how abhorrent, since the "divine" ends are believed to legitimize PDF the means.¶ The situation in Syria is unprecedented. Never before has a WMD-armed country fallen into civil war. All states in the region stand poised to lose if these weapons find their way outside of Syria. The best possible outcome, in terms of controlling Syria's enormous WMD arsenal, would be for Assad to maintain power, but such an outcome seems increasingly implausible. And there is painfully little evidence that democratic forces are likely to take over in Syria. Even if they do eventually triumph, it will take months or years to consolidate control over the entire country.¶ If chaos ensues in Syria, the United States cannot go it alone in securing hundreds of tons of Syrian WMD. Regional leaders -- including some, such as Sunni Saudi Arabia and Shiite Iran, that are now backing the insurgency and the regime, respectively -- must come together and begin planning to avert a dispersion of Syrian chemical or **biological weapons** that would **threaten everyone**, of any political or religious persuasion, in the Middle East and around the world.

#### New gene manipulation takes out your defense

MSNBC 2011

(“Clinton warns of bioweapon threat from gene tech,” pg online @ http://www.msnbc.msn.com/id/45584359/ns/… “For an international verification system — akin to that for nuclear weapons — saying it is too complicated to monitor every lab's activities.”)

GENEVA — New gene assembly technologythat offers great benefits for scientific research could also be used by terrorists to create biological weapons, U.S. Secretary of State Hillary Rodham Clinton warned Wednesday. **The** threat from bioweapons has drawn little attention in recent years, as governments focused more on the risk of nuclear weapons proliferation to countries such as Iran and North Korea. But experts have warned that the increasing ease with which bioweapons can be created might be used by terror groups to develop and spread new diseases that could mimic the effects of the fictional global epidemic portrayed in the Hollywood thriller **"**Contagion." Speaking at an international meeting in Geneva aimed at reviewing the 1972 Biological Weapons Convention, Clinton told diplomats that the challenge was to maximize the benefits of scientific research and minimize the risks that it could be used for harm. "The emerging gene synthesis industry is making genetic material more widely available**,"** she said. "This has many benefits for research, but it could also potentially be used to assemble the components of a deadly organism." Gene synthesis allows genetic material — the building blocks of all organisms — to be artificially assembled in the lab, greatly speeding up the creation of artificial viruses and bacteria. The U.S. government has cited efforts by terrorist networks such as al-Qaeda to recruit scientists capable of making biological weapons as a national security concern. "Acrude but effective terrorist weapon can be made using a small sample of any number of widely available pathogens, inexpensive equipment, and college-level chemistry and biology," Clinton told the meeting. "Less than a year ago**,** al-Qaeda in the Arabian Peninsula made a call to arms for, and I quote, 'brothers with degrees in microbiology or chemistry ... to develop a weapon of mass destruction**,'"** she said. Clinton also mentioned the Aum Shinrikyo cult's attempts in Japan to obtain anthrax in the 1990s, and the 2001 anthrax attack**s** in the United States that killed five people. Washington has urged countries to be more transparent about their efforts to clamp down on the threat of bioweapons. But U.S. officials have also resisted calls for an international verification system — akin to that for nuclear weapons — saying it is too complicated to monitor every lab's activities

#### Extinction

Ochs 2

**(**Richard, Naturalist – Grand Teton National park with Masters in Natural Resource Management – Rutgers, “Biological Weapons must be abolished immediately” 6-9, http://www.freefromterror.net/other\_articles/abolish.html)

Of all the weapons of mass destruction, the genetically engineered **biological weapons**, many without a known cure or vaccine, **are an extreme danger to the continued survival of life** on earth. Any perceived **military** value **or deterrence pales in comparison to the great risk these weapons pose just sitting in vials in laboratories.** While a "nuclear winter," resulting from a massive exchange of **nuclear weapons**, could also kill off most of life on earth and severely compromise the health of future generations, they **are easier to control**. **Biological weapons**, on the other hand**, can get out of control very easily**, as the recent anthrax attacks has demonstrated. There is no way to guarantee the security of these doomsday weapons because very tiny amounts can be stolen or accidentally released and then grow or be grown to horrendous proportions. The Black Death of the Middle Ages would be small in comparison to the potential damage bioweapons could cause. Abolition of chemical weapons is less of a priority because, while they can also kill millions of people outright, their persistence in the environment would be less than nuclear or biological agents or more localized. Hence, chemical weapons would have a lesser effect on future generations of innocent people and the natural environment. Like the Holocaust, once a localized chemical extermination is over, it is over. With nuclear and biological weapons, the killing will probably never end. Radioactive elements last tens of thousands of years and will keep causing cancers virtually forever. Potentially worse than that, bio-engineered agents by the hundreds with no known cure could wreck even greater calamity on the human race than could persistent radiation. AIDS and ebola viruses are just a small example of recently emerging plagues with no known cure or vaccine. Can we imagine hundreds of such plagues? **HUMAN EXTINCTION IS NOW POSSIBLE**.

### Nuclear Leadership

#### Global SMR development’s inevitable – only a question of whether the US leads

Hiruo 10
(Elaine, Managing Editor of Platts, "SMR technology gives US chance at market leadership, vendors say," 9-2-10, Lexis)

The US nuclear industry lost its leadership position in the global market for large reactors and now has the opportunity to secure that role for small modular reactors, some SMR vendors told a subcommittee of the Blue Ribbon Commission on America's Nuclear Future August 30.¶ But they stressed their companies will need the federal government's help to beat foreign competitors to the market.¶ "We're at a unique crossroads right now," Christofer Mowry, president of Babcock and Wilcox Nuclear Energy, told the reactor and fuel cycle technology subcommittee during its two-day meeting in Washington. B&W is one of several US companies — including Hyperion Power Generation, NuScale and Westinghouse — developing an SMR design.¶ "Other countries want a technology that has been built in the host country first," Paul Lorenzini, CEO of NuScale, told the panel. "There are lots of small reactor designs out there," he said. Both the Koreans and Japanese have SMR programs, according to industry executives on the speakers panel. The question is, Mowry said, who enters the global market first with a reactor already operating on its home turf.

#### China is exporting nuclear power to expand their leadership – causes Chinese aggression and instability

Blank ‘10

Research Professor of National Security Affair, Strategic Studies Institute (Stephen, China puts down marker in nuclear power race, [www.atimes.com/atimes/China\_Business/LF16Cb01.html](http://www.atimes.com/atimes/China_Business/LF16Cb01.html))

¶ China announced in late April the sale of two nuclear reactors to Pakistan. This deal is clearly against the guidelines of the Nuclear Suppliers Group (NSG) and the spirit if not the letter of the nuclear Non-proliferation Treaty (NPT) [1]. Nevertheless, the United States has not and may not even register a protest to this sale in spite of its implications for regional stability. Washington's desire for Beijing's support for effective sanctions on Iran dampens the political will to take Beijing to task on other international issues [2]. Although the announcement of this deal does not come as a surprise, the sale reinforces China's long-standing ties to Pakistan and the country's sensitive nuclear program, and it testifies to the growing strength of China's nuclear industry through its ability and desire to export to foreign markets. As the Iran connection also demonstrates, this deal is taking place within a strategic framework that extends beyond Sino-Pakistani relations. Indeed, China's sale of additional nuclear reactors to Pakistan is happening in the context of renewed aggressiveness by major nuclear powers to export reactors and technology abroad on a global scale and the parallel expansion of the desire by many Asian states for nuclear energy. China has already built one reactor, the Chashma-1 in Punjab and is building a second one, Chashma-2. According to the "new" deal, China is lending Pakistan $207 million to buy two more reactors, Chashma-3 and Chashma-4. Beijing and Islamabad argue that these new deals do not violate the NSG guidelines because they are part of the original deal for Chashma-1 and 2 from 2004 before China joined the NSG. Pakistan has sought nuclear reactors from China since 2008 at least and oft-cites as Islamabad's defense the 2005 Indo-American deal where the George W Bush administration prevailed upon the NSG in 2008 to grant India a waiver even though New Delhi is not a signatory to the NPT. Naturally, the Indo-US deal infuriated the Pervez Musharraf regime and its successor regime headed by President Asif Ali Zardari. Pakistan claimed that it also had urgent energy needs that could only be solved by nuclear energy imports, but the United States, though it recognizes those needs, fobbed Pakistan off. At the same time, however, India's success with the NSG owed much to its very good record on non-proliferation, something that cannot be said about Pakistan. To be sure, China has long supported Pakistan's nuclear and military programs to check Indian power. This deal is another sign of the Middle Kingdom's growing assertiveness in international affairs. For example, about a month before the sale to Pakistan, China reportedly announced the opening of a missile plant in Iran. This plant, taken in tandem with China's growing nuclear exports, arguably betokens an expansion in China's support for dubious states in the proliferation context. The flap over Myanmar's nuclear ambitions is further cause for concern about risks for regional instability. There is no doubt that China's overall foreign and defense policy has become generally assertive but there is more within the context of this deal than its growing assertiveness. Nonetheless, China's assertiveness on these issues is palpable. China plays in the nuclear export arena as both an importer and exporter. It has imported reactors and enrichment plants from the United States, France and Russia. It currently seeks to import the newest fourth generation reactors for commercial use. Yet in 2008, after years of frustration, it coordinated a state policy to develop nuclear power independently and it now intends to compete with other exporters (eg South Korea). Thus, China has recently opened up discussions with Turkey and Arab states about selling to Istanbul nuclear reactors and technology ostensibly for peaceful use. Finally, although China never misses opportunities to proclaim its devotion to the cause of nuclear nonproliferation, it has in fact, been a major proliferator of missile technology to Iran, among others [3]. At the same time, China's import and export activities reflect the growing global demand for nuclear power. The surge in demand for nuclear energy has several causes. Given the "oil shock" of the previous decade, even though prices have fallen 40-50% from their high in 2008, many states that lack hydrocarbon resources are searching for what they believe is a more stable, reliable, and domestically based source of energy in the face of expected recoveries of their domestic demand for energy. Another driver of demand for nuclear energy is the growing concern for the dangers of climate change brought on by profligate hydrocarbon use. Allegedly, nuclear energy - safely and properly used - represents less of a risk to the environment. China's deal with Pakistan must also be viewed in the context of this heightened competition to export nuclear technology and the parallel-expansion in demand for it. The most recent precedent of a nuclear energy deal is the US-India nuclear deal whereby the United States will provide India with civilian nuclear energy and for which Washington got a waiver in the NSG. At the time, it aroused much controversy precisely for the reason that it violated NSG guidelines and the spirit of the Nonproliferation Treaty [4]. However, since then there has been a veritable explosion of competition among Asian and European providers (including the United States) to sell nuclear technology abroad, not least to India. South Korea's shocking victory over France in the competition to sell to the United Arab Emirates has had major effects abroad in this context. South Korea clearly aims to be a major nuclear power exporter. Its firms like Korea Electric Power Co are active in India, China, Jordan, and Turkey [5]. South Korea aims to capture 20% of the global market by 2030 and export 80 nuclear reactors [6]. South Korean President Lee Myung-bak has publicly expressed his belief that this deal with the United Arab Emirates will facilitate other exports abroad. Yet South Korea's stunning example has not been lost on its competitors, Japan and China. For instance, in Japan, A new company should be formed later this year to support Japanese exports of nuclear power technology and knowledge. The Ministry of Economy Trade and Industry (Meti) has agreed to set up the firm with involvement from utilities the Tokyo, Chubu and Kansai electric power companies as well as with reactor vendors Toshiba, Hitachi and Mitsubishi Heavy Industries. The Innovation Network of Japan - a joint venture of government and industry - may also join. The move is seen as a reaction to South Korea's success in exporting to the United Arab Emirates and directed towards winning new nuclear contracts with the emerging nuclear countries of South-East Asia [7]. Not to be undone, Japan is now considering relaxing its restrictions on the export of nuclear technology, specifically to India (part of the larger dawning Indo-Japanese partnership due to the rise of China). These discussions reflect the forces driving the nuclear export and import in Asia. Since getting its waiver from the NSG India has concluded civil nuclear deals with the United States, France, Russia, and Kazakhstan. India clearly wants to cement ties with Japan in this and other domains, and Japan, likewise, wants stronger ties with India and not to be left out of one of the biggest nuclear markets in the world [8]. More recently, the two states agreed to form a working group to prepare the way for a reactor sale devoted strictly to peaceful purposes. Clearly, the pressure from South Korea is prompting Japan to gear up and compete in the exploding Asian market with its spiraling demand for electricity and all forms of power. South Korea and Japan are hardly the only rivals in this field. France and the United States are long-standing purveyors of peaceful nuclear technology. Russia, since 2006 has been competing on a global scale for uranium sources and to see nuclear reactors across the globe. Moscow's efforts in this field merit a separate analysis but it is a vigorous rival for these other Asian and Western exporters. Therefore, China's recent nuclear exports to Pakistan and the future of its nuclear exports in general need to be examined in these three contexts. The first context is that of the overall growth of the assertiveness of China's diplomacy in general and efforts to use nuclear power and military instruments like missiles as sources of influence abroad. In the case of exports to Pakistan, a second context is the long-standing geopolitical rivalry among India, China and Pakistan in which China's "all-weather" friendship with Pakistan has been a deliberate and conscious Chinese strategy to inhibit the growth of Indian power. Finally, we must keep in mind that China is not only an exporter of nuclear energy, it also is a consumer of that energy and so it will be a key market for other exports from the likes of Russia, the United States, France, South Korea, and Japan. As an importer, it obviously will welcome the rivalry of exporters who wish to sell to it so that it can obtain more favorable terms. However, as an exporter of nuclear energy and a power that wants to export more of it for both economic and political gain, it cannot afford to let either its rivals outpace it in Asia or in other areas that China deems as essential to the pursuit of its larger strategic goals.

#### US nuclear expansion is key to check Chinese heg in Asia – regains US influence

Cullinane ‘11

[Scott Cullinane is a graduate student at the Institute of World Politics in Washington, D.C <http://www.ensec.org/index.php?option=com_content&view=article&id=319:america-falling-behind-the-strategic-dimensions-of-chinese-commercial-nuclear-energy&catid=118:content&Itemid=376> ETB]

Due to a confluence of events the United States has recently focused more attention on nuclear weapons policy than it has in previous years; however, the proliferation of commercial nuclear technology and its implications for America’s strategic position have been largely ignored. While the Unites States is currently a participant in the international commercial nuclear energy trade, America’s own domestic construction of nuclear power plants has atrophied severely and the US risks losing its competitive edge in the nuclear energy arena.¶ Simultaneously, the People’s Republic of China (PRC) has made great strides in closing the nuclear energy development gap with America. Through a combination of importing technology, research from within China itself, and a disciplined policy approach the PRC is increasingly able to leverage the export of commercial nuclear power as part of its national strategy. Disturbingly, China does not share America’s commitment to stability, transparency, and responsibility when exporting nuclear technology. This is a growing strategic weakness and risk for the United States. To remain competitive and to be in a position to offset the PRC when required the American government should encourage the domestic use of nuclear power and spur the forces of technological innovation.¶ History has recorded well American wartime nuclear developments which culminated in the July 1945 Trinity Test, but what happened near Arco, Idaho six years later has been overlooked. In 1951, scientists for the first time produced usable electricity from an experimental nuclear reactor. Once this barrier was conquered the atom was harnessed to generate electricity and permitted America to move into the field of commercial nuclear power. In the next five years alone the United States signed over 20 nuclear cooperation agreements with various countries. Not only did the US build dozens of power plants domestically during the 1960s and 1970s, the US Export-Import Bank also distributed $7.1 billion dollars in loans and guarantees for the international sale of 49 reactors. American built and designed reactors were exported around the world during those years. Even today, more than 60% of the world’s 440 operating reactors are based on technology developed in the United States. The growth of the US civilian nuclear power sector stagnated after the Three Mile Island incident in 1979 – the most serious accident in American civilian nuclear power history. Three Mile Island shook America’s confidence in nuclear power and provided the anti-nuclear lobby ample fuel to oppose the further construction of any nuclear power plants. In the following decade, 42 planned domestic nuclear power plants were cancelled, and in the 30 years since the Three Mile Island incident the American nuclear power industry has survived only through foreign sales and merging operations with companies in Asia and Europe. Westinghouse sold its nuclear division to Toshiba and General Electric joined with Hitachi. Even the highest levels of the American government came to cast nuclear power aside. President Bill Clinton bragged in his 1993 State of the Union Address that “we are eliminating programs that are no longer needed, such as nuclear power research and development.” ¶ America’s slow pace of reactor construction over the past three decades has stymied innovation and caused the nuclear sector and its industrial base to shrivel. While some aspects of America’s nuclear infrastructure still operate effectively, many critical areas have atrophied. For example, one capability that America has entirely lost is the means to cast ultra heavy forgings in the range of 350,000 – 600,000 pounds, which impacts the construction of containment vessels, turbine rotors, and steam generators. In contrast, Japan, China, and Russia all possess an ultra heavy forging capacity and South Korea and India plan to build forges in this range. Likewise, the dominance America enjoyed in uranium enrichment until the 1970s is gone. The current standard centrifuge method for uranium enrichment was not invented in America and today 40% of the enriched uranium US power plants use is processed overseas and imported. Another measure of how much the US nuclear industry has shrunk is evident in the number of companies certified to handle nuclear material. In the 1980s the United States had 400 nuclear suppliers and 900 holders of N-stamp certificates (N-stamps are the international nuclear rating certificates issued by the American Society of Mechanical Engineers). By 2008 that number had reduced itself to 80 suppliers and 200 N-stamp holders. A recent Government Accountability Office report, which examined data from between 1994 and 2009, found the US to have a declining share of the global commercial nuclear trade. However, during that same period over 60 reactors were built worldwide. Nuclear power plants are being built in the world increasingly by non-American companies.¶ The American nuclear industry entered the 1960s in a strong position, yet over the past 30 years other countries have closed the development gap with America. The implications of this change go beyond economics or prestige to include national security. These changes would be less threatening if friendly allies were the ones moving forward with developing a nuclear export industry; however, the quick advancement of the PRC in nuclear energy changes the strategic calculus for America.¶ The shifting strategic landscape¶ While America’s nuclear industry has languished, current changes in the world’s strategic layout no longer allow America the option of maintaining the status quo without being surpassed. The drive for research, development, and scientific progress that grew out of the Cold War propelled America forward, but those priorities have long since been downgraded by the US government. The economic development of formerly impoverished countries means that the US cannot assume continued dominance by default. The rapidly industrializing PRC is seeking its own place among the major powers of the world and is vying for hegemony in Asia; nuclear power is an example of their larger efforts to marshal their scientific and economic forces as instruments of national power.¶ The rise of China is a phrase that connotes images of a backwards country getting rich off of exporting cheap goods at great social and environmental costs. Yet, this understanding of the PRC has lead many in the United States to underestimate China’s capabilities. The Communist Party of China (CPC) has undertaken a comprehensive long-term strategy to transition from a weak state that lags behind the West to a country that is a peer-competitor to the United States. Nuclear technology provides a clear example of this. ¶ In 1978, General Secretary Deng Xiaoping began to move China out of the destructive Mao era with his policies of 'reform and opening.' As part of these changes during the 1980s, the CPC began a concerted and ongoing effort to modernize the PRC and acquire advanced technology including nuclear technology from abroad. This effort was named Program 863 and included both legal methods and espionage. By doing this, the PRC has managed to rapidly catch up to the West on some fronts. In order to eventually surpass the West in scientific development the PRC launched the follow-on Program 973 to build the foundations of basic scientific research within China to meet the nation’s major strategic needs. These steps have brought China to the cusp of the next stage of technological development, a stage known as “indigenous innovation.”¶ ¶ In 2006 the PRC published their science and technology plan out to 2020 and defined indigenous innovation as enhancing original innovation, integrated innovation, and re-innovation based on assimilation and absorption of imported technology in order improve national innovation capability. The Chinese seek to internalize and understand technological developments from around the world so that they can copy the equipment and use it as a point to build off in their own research. This is a step beyond merely copying and reverse engineering a piece of technology. The PRC sees this process of absorbing foreign technology coupled with indigenous innovation as a way of leapfrogging forward in development to gain the upper hand over the West. The PRC’s official statement on energy policy lists nuclear power as one of their target fields. When viewed within this context, the full range of implications from China’s development of nuclear technology becomes evident. The PRC is now competing with the United States in the areas of innovation and high-technology, two fields that have driven American power since World War Two. China’s economic appeal is no longer merely the fact that it has cheap labor, but is expanding its economic power in a purposeful way that directly challenges America’s position in the world.¶ ¶ The CPC uses the market to their advantage to attract nuclear technology and intellectual capital to China. The PRC has incentivized the process and encouraged new domestic nuclear power plant construction with the goal of having 20 nuclear power plants operational by 2020. The Chinese Ministry of Electrical Power has described PRC policy to reach this goal as encouraging joint investment between State Owned Corporations and foreign companies. 13 reactors are already operating in China, 25 more are under construction and even more reactors are in the planning stages. ¶ In line with this economic policy, China has bought nuclear reactors from Westinghouse and Areva and is cooperating with a Russian company to build nuclear power plants in Taiwan. By stipulating that Chinese companies and personnel be involved in the construction process, China is building up its own domestic capabilities and expects to become self-sufficient. China’s State Nuclear Power Technology Corporation has partnered with Westinghouse to build a new and larger reactor based on the existing Westinghouse AP 1000 reactor. This will give the PRC a reactor design of its own to then export. If the CPC is able to combine their control over raw materials, growing technical know-how, and manufacturing base, China will not only be a powerful economy, but be able to leverage this power to service its foreign policy goals as well.¶ Even though the PRC is still working to master third generation technology, their scientists are already working on what they think will be the nuclear reactor of the future. China is developing Fourth Generation Fast Neutron Reactors and wants to have one operational by 2030. Additionally, a Chinese nuclear development company has announced its intentions to build the “world’s first high-temperature, gas-cooled reactor” in Shandong province which offers to possibility of a reactor that is nearly meltdown proof. A design, which if proved successful, could potentially redefine the commercial nuclear energy trade.¶ The risk to America¶ The international trade of nuclear material is hazardous in that every sale and transfer increases the chances for an accident or for willful misuse of the material. Nuclear commerce must be kept safe in order for the benefits of nuclear power generation to be realized. Yet, China has a record of sharing dangerous weapons and nuclear material with unfit countries. It is a risk for America to allow China to become a nuclear exporting country with a competitive technical and scientific edge. In order to limit Chinese influence and the relative attractiveness of what they can offer, America must ensure its continuing and substantive lead in reactor technology.¶ ¶ The PRC’s record of exporting risky items is well documented. It is known that during the 1980s the Chinese shared nuclear weapon designs with Pakistan and continues to proliferate WMD-related material. According to the Office of the Director of National Intelligence to Congress, China sells technologies and components in the Middle East and South Asia that are dual use and could support WMD and missile programs. Jane’s Intelligence Review reported in 2006 that China,¶ Despite a 1997 promise to Washington to halt its nuclear technology sales to Iran, such assistance is likely to continue. In 2005, Iranian resistance groups accused China of selling Iran beryllium, which is useful for making nuclear triggers and maraging steel (twice as hard as stainless steel), which is critical for fabricating centrifuges needed to reprocess uranium into bomb-grade material. ¶ China sells dangerous materials in order to secure its geopolitical objectives, regardless if those actions harm world stability. There is little reason to believe China will treat the sale of nuclear reactors any differently. Even if the PRC provides public assurances that it will behave differently in the future, the CPC has not been truthful for decades about its nuclear material and weapons sales and hence lacks credibility. For example, in 1983 Chinese Vice Premier Li Peng said that China does not encourage or support nuclear proliferation. In fact, it was that same year that China contracted with Algeria, then a non-NPT [Non-Proliferation Treaty] state, to construct a large, unsafeguarded plutonium production reactor. In 1991 a Chinese Embassy official wrote in a letter to the The Washington Post that 'China has struck no nuclear deal with Iran.' In reality, China had provided Iran with a research reactor capable of producing plutonium and a calutron, a technology that can be used to enrich uranium to weapons-grade. It has been reported that even after United Nation sanctions were put on Iran, Chinese companies were discovered selling “high-quality carbon fiber” and “pressure gauges” to Iran for use in improving their centrifuges.¶ In 2004 the PRC joined the Nuclear Suppliers Groups (NSG), gaining international recognition of their growing power in the nuclear field. In spite of this opportunity for China to demonstrate its responsibility with nuclear energy, it has not fulfilled it NSG obligations. The PRC has kept the terms of its nuclear reactor sale to Pakistan secret and used a questionable legal technicality to justify forgoing obtaining a NSG waiver for the deal. Additionally, China chose to forgo incorporating new safety measures into the reactors in order to avoid possible complications.¶ A further consequence of China exporting reactors is that these countries may wish to control the fuel cycle which provides the uranium to power their new reactors. The spread of fuel cycle technology comes with two risks: enrichment and reprocessing. Uranium can be enriched to between 3% and 5% for reactor use, but the process can be modified to produce 90% enriched uranium which is weapons-grade. Even if a country only produces low enriched uranium they could easily begin enriching at a higher level if they so choose. Every new country that nuclear technology or information is spread to exponentially increases the risk of material being stolen, given to a third party or being used as the launching point for a weapons program. China’s history of proliferation and willingness to engage economically with very unsavory governments seems likely to increase the risks involving nuclear material.

#### SMRs are key

Rosner and Goldberg 11

(Robert Rosner, astrophysicist and founding director of the Energy Policy Institute at Chicago. He was the director of Argonne National Laboratory from 2005 to 2009, Stephen Goldberg, Special Assistant to the Director, Argonne National Laboratory ¶ Senior Fellow, Energy Policy Institute at Chicago¶ Research Coordinator, Global Nuclear Future Initiative ¶ American Academy of Arts and Sciences, “Small Modular Reactors – Key to Future Nuclear Power ¶ Generation in the U.S.” Energy Policy Institute at Chicago, <http://csis.org/files/attachments/111129_SMR_White_Paper.pdf>, SEH)

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.

#### U.S. leadership in Asia solves multiple scenarios for war

Goh 8

(Evelyn, Lecturer in International Relations in the Department of Politics and International Relations at the Univ of Oxford, International Relations of the Asia-Pacific, “Hierarchy and the role of the United States in the East Asian security order,” 2008 8(3):353-377, Oxford Journals Database)

This is the main structural dilemma: as long as the United States does not give up its primary position in the Asian regional hierarchy, China is very unlikely to act in a way that will provide comforting answers to the two questions. Yet, the East Asian regional order has been and still is constituted by US hegemony, and to change that could be extremely disruptive and may lead to regional actors acting in highly destabilizing ways. Rapid Japanese remilitarization, armed conflict across the Taiwan Straits, Indian nuclear brinksmanship directed toward Pakistan, or a highly destabilized Korean peninsula are all illustrative of potential regional disruptions. 5 Conclusion To construct a coherent account of East Asia’s evolving security order, I have suggested that the United States is the central force in constituting regional stability and order. The major patterns of equilibrium and turbulence in the region since 1945 can be explained by the relative stability of the US position at the top of the regional hierarchy, with periods of greatest insecurity being correlated with greatest uncertainty over the American commitment to managing regional order. Furthermore, relationships of hierarchical assurance and hierarchical deference explain the unusual character of regional order in the post-Cold War era. However, the greatest contemporary challenge to East Asian order is the potential conflict between China and the United States over rank ordering in the regional hierarchy, a contest made more potent because of the intertwining of regional and global security concerns. Ultimately, though, investigating such questions of positionality requires conceptual lenses that go beyond basic material factors because it entails social and normative questions. How can China be brought more into a leadership position, while being persuaded to buy into shared strategic interests and constrain its own in ways that its vision of regional and global security may eventually be reconciled with that of the United States and other regional players? How can Washington be persuaded that its central position in the hierarchy must be ultimately shared in ways yet to be determined? The future of the East Asian security order is tightly bound up with the durability of the United States’ global leadership and regional domination. At the regional level, the main scenarios of disruption are an outright Chinese challenge to US leadership, or the defection of key US allies, particularly Japan. Recent history suggests, and the preceding analysis has shown, that challenges to or defections from US leadership will come at junctures where it appears that the US commitment to the region is in doubt, which in turn destabilizes the hierarchical order. At the global level, American geopolitical over-extension will be the key cause of change. This is the one factor that Hierarchy and the role of the United States in the East Asian security order 373lead to both greater regional and global turbulence, if only by the attendant strategic uncertainly triggering off regional challenges or defections. However, it is notoriously difficult to gauge thresholds of over-extension. More positively, East Asia is a region that has adjusted to previous periods of uncertainty about US primacy. Arguably, the regional consensus over the United States as primary state in a system of benign hierarchy could accommodate a shifting of the strategic burden to US allies like Japan and Australia as a means of systemic preservation. The alternatives that could surface as a result of not doing so would appear to be much worse.

#### Asian wars go nuclear

Landy 2k

 National Security Expert @ Knight Ridder, 3/10 ¶ (Jonathan, Knight Ridder, lexis)

Few if any experts think China and Taiwan, North Korea and South Korea, or India and Pakistan are spoiling to fight. But even a minor miscalculation by any of them could destabilize Asia, jolt the global economy and even start a nuclear war. India, Pakistan and China all have nuclear weapons, and North Korea may have a few, too. Asia lacks the kinds of organizations, negotiations and diplomatic relationships that helped keep an uneasy peace for five decades in Cold War Europe. “Nowhere else on Earth are the stakes as high and relationships so fragile,” said Bates Gill, director of northeast Asian policy studies at the Brookings Institution, a Washington think tank. “We see the convergence of great power interest overlaid with lingering confrontations with no institutionalized security mechanism in place. There are elements for potential disaster.” In an effort to cool the region’s tempers, President Clinton, Defense Secretary William S. Cohen and National Security Adviser Samuel R. Berger all will hopscotch Asia’s capitals this month. For America, the stakes could hardly be higher. There are 100,000 U.S. troops in Asia committed to defending Taiwan, Japan and South Korea, and the United States would instantly become embroiled if Beijing moved against Taiwan or North Korea attacked South Korea. While Washington has no defense commitments to either India or Pakistan, a conflict between the two could end the global taboo against using nuclear weapons and demolish the already shaky international nonproliferation regime. In addition, globalization has made a stable Asia \_ with its massive markets, cheap labor, exports and resources \_ indispensable to the U.S. economy. Numerous U.S. firms and millions of American jobs depend on trade with Asia that totaled $600 billion last year, according to the Commerce Department.

#### China will risk military conflict by asserting heg in the South China Sea - US leadership is key to solve

Dillon ‘11

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The most dangerous source of instability in Asia is a rising China seeking to reassert itself, and the place China is most likely to risk a military conflict is the South China Sea. In the second decade of the 21st century, the seldom-calm waters of the South China Sea are frothing from a combination of competing naval exercises and superheated rhetoric. Many pundits, politicians, and admirals see the South China Sea as a place of future competition between powers.¶ Speculation about impending frictions started at the July 2010 asean Regional Forum (arf) when U.S. Secretary of State Hillary Clinton delivered an overdue statement on American interests in the South China Sea. Clinton averred that the United States has a national interest in freedom of navigation in the South China Sea; that the U.S. supported a collaborative process in resolving the territorial disputes there; and that the U.S. supports the 2002 asean-China declaration on the conduct of parties in the South China Sea.¶ Despite Clinton’s statement of support for China’s own agreements with the Association of Southeast Asian Nations, China’s Foreign Ministry responded negatively, claiming that the secretary’s statement was “virtually an attack on China.” China’s military stated that it was opposed to “internationalization” of the six-country dispute and commenced a new and unusually large naval exercise in South China Sea the very next week.¶ This gathering maritime confrontation is instigated by China’s assertions of sovereignty over the entire South China Sea and its stated intention to enforce that sovereignty. But the source of China’s hubris is its view of its historic mandate to rule all under heaven. Extending China’s borders a thousand miles across the South China Sea is only one policy manifestation of this vision of a new Chinese world order. Consistent with its Sinocentric ideology, Beijing believes its authority over its smaller neighbors should include determining their foreign policy. After Clinton challenged China’s claim to the entire South China Sea, China’s foreign minister reportedly glared at a Singaporean diplomat and pronounced, “China is a big country and other countries are small countries, and that’s just a fact.”1 More telling of China’s opinion of its position among nations, the following Monday China’s Foreign Ministry posted a statement that “China’s view represented the interests of ‘fellow Asians.’”¶ The competing territorial claims in the South China Sea are decades old, but today the Chinese government is full of a sense of accomplishment and the People’s Liberation Army is flush with the fastest growing military budget in the world. Clinton’s statement may have been inspired by earlier statements by Clinton’s Chinese counterpart, the state councilor responsible for foreign affairs, Dai Bingguo, directly to Clinton herself and repeated to several U.S. aides that the enforcement of China’s sovereignty over the South China Sea was a “core interest” on par with Taiwan and Tibet. While Dai Bingguo reportedly has desisted from using the term “core interest” to describe China’s maritime sovereignty, personalities in China’s military still do. In January 2011 the web site of the People’s Daily, the official organ of the Chinese Communist party, surveyed readers about whether the South China Sea is China’s “core interest”; 97 percent of nearly 4,300 respondents said yes.2¶ Short of a shooting war, protecting freedom of navigation in one of the globe’s busiest sea lanes requires an amicable resolution of the competing territorial claims. Starting a process to resolve or neutralize the problem will require American leadership and resolve. Firm diplomacy backed by convincing naval power and patient leadership can strike a balance in the region that protects freedom of navigation, the integrity of international law, and the independence and sovereignty of Southeast Asia’s nations.¶ The worst solution to the South China Sea dispute from the U.S. point of view would be for China’s asean neighbors simply to acquiesce to Beijing’s position and for the entire South China Sea to become the sovereign territory of the People’s Republic of China (prc). The Beijing position is also the worst solution for the asean and every other trading nation on the planet. But an almost as bad solution is for the U.S. to become involved in a bilateral confrontation with China without the firm endorsement and commitment to American actions by the other littoral claimants and by America’s Asia-Pacific allies. Without the support of regional alliances, the U.S. would be entangled in a campaign at the far end of its logistical tail but deep inside the reach of a large and rising power.

#### High tensions make compromise unlikely - US leadership is key to forcing multilateral agreement

Clayton 8/24

[Marquis Clayton is a Research Assistant at the East-West Center in Washington. “Uncomfortable Truths: Breaking the Impasse in the South China Sea.” Asia Pacific Bulletin #178. ETB]

¶ The final uncomfortable truth is that historical animosities and increasingly emotional¶ resource nationalism are likely to make the situation worse, possibly much worse, before¶ it gets better. The primary reason is that political leaders in the claimant countries have¶ little incentive or capability to undertake the types of compromise which would be¶ required to resolve the disputes. In the Philippines, President Benigno Aquino has¶ staked out a much tougher stance on South China Sea issues than his predecessor’s¶ policies which he saw as weak and encouraging Chinese aggression. In the aftermath of¶ the incidents last year at Reed Bank and this year at both Scarborough and Half Moon¶ Shoals, he is unlikely to begin promoting a more conciliatory approach.¶ In Vietnam, public protests and opposition to concessions on territorial and sovereignty¶ disputes with China leave its leaders very little room to maneuver. Considering the¶ history of conflict between the two nations and recent disputes over arrests and¶ detentions of fishermen as well as drilling rights in contested areas, it is unlikely that¶ such public sentiment will be easy to reduce.¶ In China, the national leadership will be undergoing a major change for the first time in¶ a decade. The new incoming party secretary and president, Xi Jinping, will seek to¶ consolidate his power and is unlikely to make one of his first foreign policy initiatives a¶ weakening of China’s claims of sovereignty in the South China Sea, a move which¶ would face stiff opposition from the military and public. In short, without substantial¶ outside pressure to do so, claimant countries are not likely to soften their stances or¶ undertake major initiatives to improve the situation.¶ The United States is the only country with the ability to break this impasse. It is the only¶ party with the diplomatic, economic and military influence in the region to alter the¶ status quo in a positive manner as ASEAN has proven incapable of doing so, while¶ China has shown itself unwilling to do so. This means the United States must go even¶ further than it already has in laying out its interests in the future regional order and¶ guiding the various claimants through facing these uncomfortable truths and modifying¶ their current approaches to resolving the disputes. Other specific measures will include¶ increasing efforts to improve the capabilities of the Filipino and Vietnamese armed¶ forces to patrol and monitor their maritime peripheries.

#### Territorial disputes snowball - causes nuclear conflict

Chakraborty 10

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The first ASEAN Defence Ministers Meeting Plus Eight (China, India, Japan, South Korea, Australia, New Zealand, Russia and the USA) was held on the 12th of October. When this frame work of ADMM Plus Eight came into news for the first time it was seen as a development which could be the initiating step to a much needed security architecture in the Asia Pacific. Asia Pacific is fast emerging as the economic center of the world, consequently securing of vulnerable economic assets has becomes mandatory. The source of threat to economic assets is basically unconventional in nature like natural disasters, terrorism and maritime piracy. This coupled with the conventional security threats and flashpoints based on territorial disputes and political differences are very much a part of the region posing a major security challenge.¶ As mentioned ADMM Plus Eight can be seen as the first initiative on such a large scale where the security concerns of the region can be discussed and areas of cooperation can be explored to keep the threats at bay. The defence ministers of the ten ASEAN nations and the eight extra regional countries (Plus Eight) during the meeting have committed to cooperation and dialogue to counter insecurity in the region. One of the major reasons for initiation of such a framework has been the new face of threat which is non-conventional and transnational which makes it very difficult for an actor to deal with it in isolation. Threats related to violent extremism, maritime security, vulnerability of SLOCs, transnational crimes have a direct and indirect bearing on the path of economic growth. Apart from this the existence of territorial disputes especially on the maritime front plus the issues related to political differences, rise of China and dispute on the Korean Peninsula has aggravated the security dilemma in the region giving rise to areas of potential conflict. This can be seen as a more of a conventional threat to the region.¶ The question here is that how far this ADMM Plus Eight can go to address the conventional security threats or is it an initiative which would be confined to meetings and passing resolution and playing second fiddle to the ASEAN summit. It is very important to realize that when one is talking about effective security architecture for the Asia Pacific one has to talk in terms of addressing the conventional issues like the territorial and political disputes. These issues serve as bigger flashpoint which can snowball into a major conflict which has the possibility of turning into a nuclear conflict.

#### Risk of conflict is high - miscalc triggers escalation and US gets drawn in

Glaser ‘12

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The risk of conflict in the South China Sea is significant. China, Taiwan, Vietnam, Malaysia, Brunei, and the Philippines have competing territorial and jurisdictional claims, particularly over rights to exploit the region's possibly extensive reserves of oil and gas. Freedom of navigation in the region is also a contentious issue, especially between the United States and China over the right of U.S. military vessels to operate in China's two-hundred-mile exclusive economic zone (EEZ). These tensions are shaping—and being shaped by—rising apprehensions about the growth of China's military power and its regional intentions. China has embarked on a substantial modernization of its maritime paramilitary forces as well as naval capabilities to enforce its sovereignty and jurisdiction claims by force if necessary. At the same time, it is developing capabilities that would put U.S. forces in the region at risk in a conflict, thus potentially denying access to the U.S. Navy in the western Pacific.¶ Given the growing importance of the U.S.-China relationship, and the Asia-Pacific region more generally, to the global economy, the United States has a major interest in preventing any one of the various disputes in the South China Sea from escalating militarily.¶ The Contingencies¶ Of the many conceivable contingencies involving an armed clash in the South China Sea, three especially threaten U.S. interests and could potentially prompt the United States to use force.¶ The most likely and dangerous contingency is a clash stemming from U.S. military operations within China's EEZ that provokes an armed Chinese response. The United States holds that nothing in the United Nations Convention on the Law of the Sea (UNCLOS) or state practice negates the right of military forces of all nations to conduct military activities in EEZs without coastal state notice or consent. China insists that reconnaissance activities undertaken without prior notification and without permission of the coastal state violate Chinese domestic law and international law. China routinely intercepts U.S. reconnaissance flights conducted in its EEZ and periodically does so in aggressive ways that increase the risk of an accident similar to the April 2001 collision of a U.S. EP-3 reconnaissance plane and a Chinese F-8 fighter jet near Hainan Island. A comparable maritime incident could be triggered by Chinese vessels harassing a U.S. Navy surveillance ship operating in its EEZ, such as occurred in the 2009 incidents involving the USNS Impeccable and the USNS Victorious. The large growth of Chinese submarines has also increased the danger of an incident, such as when a Chinese submarine collided with a U.S. destroyer's towed sonar array in June 2009. Since neither U.S. reconnaissance aircraft nor ocean surveillance vessels are armed, the United States might respond to dangerous behavior by Chinese planes or ships by dispatching armed escorts. A miscalculation or misunderstanding could then result in a deadly exchange of fire, leading to further military escalation and precipitating a major political crisis. Rising U.S.-China mistrust and intensifying bilateral strategic competition would likely make managing such a crisis more difficult.¶ A second contingency involves conflict between China and the Philippines over natural gas deposits, especially in the disputed area of Reed Bank, located eighty nautical miles from Palawan. Oil survey ships operating in Reed Bank under contract have increasingly been harassed by Chinese vessels. Reportedly, the United Kingdom-based Forum Energy plans to start drilling for gas in Reed Bank this year, which could provoke an aggressive Chinese response. Forum Energy is only one of fifteen exploration contracts that Manila intends to offer over the next few years for offshore exploration near Palawan Island. Reed Bank is a red line for the Philippines, so this contingency could quickly escalate to violence if China intervened to halt the drilling.¶ The United States could be drawn into a China-Philippines conflict because of its 1951 Mutual Defense Treaty with the Philippines. The treaty states, "Each Party recognizes that an armed attack in the Pacific Area on either of the Parties would be dangerous to its own peace and safety and declares that it would act to meet the common dangers in accordance with its constitutional processes." American officials insist that Washington does not take sides in the territorial dispute in the South China Sea and refuse to comment on how the United States might respond to Chinese aggression in contested waters. Nevertheless, an apparent gap exists between American views of U.S. obligations and Manila's expectations. In mid-June 2011, a Filipino presidential spokesperson stated that in the event of armed conflict with China, Manila expected the United States would come to its aid. Statements by senior U.S. officials may have inadvertently led Manila to conclude that the United States would provide military assistance if China attacked Filipino forces in the disputed Spratly Islands.¶ With improving political and military ties between Manila and Washington, including a pending agreement to expand U.S. access to Filipino ports and airfields to refuel and service its warships and planes, the United States would have a great deal at stake in a China-Philippines contingency. Failure to respond would not only set back U.S. relations with the Philippines but would also potentially undermine U.S. credibility in the region with its allies and partners more broadly. A U.S. decision to dispatch naval ships to the area, however, would risk a U.S.-China naval confrontation.¶ Disputes between China and Vietnam over seismic surveys or drilling for oil and gas could also trigger an armed clash for a third contingency. China has harassed PetroVietnam oil survey ships in the past that were searching for oil and gas deposits in Vietnam's EEZ. In 2011, Hanoi accused China of deliberately severing the cables of an oil and gas survey vessel in two separate instances. Although the Vietnamese did not respond with force, they did not back down and Hanoi pledged to continue its efforts to exploit new fields despite warnings from Beijing. Budding U.S.-Vietnam relations could embolden Hanoi to be more confrontational with China on the South China Sea issue.¶ The United States could be drawn into a conflict between China and Vietnam, though that is less likely than a clash between China and the Philippines. In a scenario of Chinese provocation, the United States might opt to dispatch naval vessels to the area to signal its interest in regional peace and stability. Vietnam, and possibly other nations, could also request U.S. assistance in such circumstances. Should the United States become involved, subsequent actions by China or a miscalculation among the forces present could result in exchange of fire. In another possible scenario, an attack by China on vessels or rigs operated by an American company exploring or drilling for hydrocarbons could quickly involve the United States, especially if American lives were endangered or lost. ExxonMobil has plans to conduct exploratory drilling off Vietnam, making this an existential danger. In the short term, however, the likelihood of this third contingency occurring is relatively low given the recent thaw in Sino-Vietnamese relations. In October 2011, China and Vietnam signed an agreement outlining principles for resolving maritime issues. The effectiveness of this agreement remains to be seen, but for now tensions appear to be defused.¶ Warning Indicators¶ Strategic warning signals that indicate heightened risk of conflict include political decisions and statements by senior officials, official and unofficial media reports, and logistical changes and equipment modifications. In the contingencies described above, strategic warning indicators could include heightened rhetoric from all or some disputants regarding their territorial and strategic interests. For example, China may explicitly refer to the South China Sea as a core interest; in 2010 Beijing hinted this was the case but subsequently backed away from the assertion. Beijing might also warn that it cannot "stand idly by" as countries nibble away at Chinese territory, a formulation that in the past has often signaled willingness to use force. Commentaries and editorials in authoritative media outlets expressing China's bottom line and issuing ultimatums could also be a warning indicator. Tough language could also be used by senior People's Liberation Army (PLA) officers in meetings with their American counterparts. An increase in nationalistic rhetoric in nonauthoritative media and in Chinese blogs, even if not representing official Chinese policy, would nevertheless signal pressure on the Chinese leadership to defend Chinese interests. Similar warning indicators should be tracked in Vietnam and the Philippines that might signal a hardening of those countries' positions.¶ Tactical warning signals that indicate heightened risk of a potential clash in a specific time and place include commercial notices and preparations, diplomatic and/or military statements warning another claimant to cease provocative activities or suffer the consequences, military exercises designed to intimidate another claimant, and ship movements to disputed areas. As for an impending incident regarding U.S. surveillance activities, statements and unusual preparations by the PLA might suggest a greater willingness to employ more aggressive means to intercept U.S. ships and aircraft.

#### US-China war goes nuclear

Hunkovic 9

Lee J. Hunkovic -- professor at American Military University, 09, [“The Chinese-Taiwanese Conflict Possible Futures of a Confrontation between China, Taiwan and the United States of America”, American Military University, p.54]

A war between China, Taiwan and the United States has the potential to escalate into a nuclear conflict and a third world war, therefore, many countries other than the primary actors could be affected by such a conflict, including Japan, both Koreas, Russia, Australia, India and Great Britain, if they were drawn into the war, as well as all other countries in the world that participate in the global economy, in which the United States and China are the two most dominant members. If China were able to successfully annex Taiwan, the possibility exists that they could then plan to attack Japan and begin a policy of aggressive expansionism in East and Southeast Asia, as well as the Pacific and even into India, which could in turn create an international standoff and deployment of military forces to contain the threat. In any case, if China and the United States engage in a full-scale conflict, there are few countries in the world that will not be economically and/or militarily affected by it. However, China, Taiwan and United States are the primary actors in this scenario, whose actions will determine its eventual outcome, therefore, other countries will not be considered in this study.

#### Chinese lead in nuclear exports causes terrorist theft and meltdowns

Tu 12

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It’s first important to acknowledge that the safety oversight mechanism is one of the weakest links of the Chinese nuclear industry. Currently, the National Development and Reform Commission, which overseas nuclear development, is the most politically powerful ministry. In comparison, China’s civil nuclear watchdog is supervised by a much weaker Ministry of Environmental Protection (MEP). Such an unbalanced bureaucratic hierarchical arrangement and internal power struggle among different stakeholders has prevented a timely overhaul of China’s nuclear oversight mechanism.¶ ¶ Right after the Fukushima disaster, the MEP publically expressed support for the further expansion of the Chinese nuclear industry. Since the MEP supervises China’s civil nuclear safety watchdog, such a gesture has unnecessarily blurred the administrative boundary between the nuclear safety regulator and industry development administration. This again underlines the urgent need for China to fundamentally reform its nuclear safety oversight mechanism in order to avoid the cozy bureaucratic collusion between government and industry that has befallen the Japanese nuclear industry. ¶ ¶ A lack of transparency in the industry also remains an issue. Immediately after the disaster in Japan, there was a panicked buying spree of iodized salt across China. Even after both the Chinese government and experts publically clarified that this was entirely unnecessary, it still took quite a while for the general public to calm down. This event not only indicates Chinese society’s lack of fundamental understanding on nuclear issues, due largely to the prolonged secretive operations of the Chinese nuclear industry, but also clearly illustrates the absence of basic trust between the Chinese government and civil society.¶ ¶ Since then, the lack of transparency hasn’t fundamentally changed. On January 11, when a new Global Nuclear Materials Security Index was launched, China ranked 29th among a group of 32 nuclear nations in terms of nuclear security and materials transparency.¶ The country’s ability to safely export nuclear technology and equipment to overseas markets is yet another challenge that needs to be addressed. Thus far, China has exported its second generation reactors to Pakistan, which are less sophisticated than the imported third generation reactors under construction in China. But the country lacks both sufficient domestic capacity and faces numerous patent-related constraints before it can develop its own export-ready advanced nuclear reactors. While the second generation nuclear technology exported to Pakistan has already been phased out domestically due to safety concerns, it’s still possible for China to be lured by economic and geopolitical considerations into additional nuclear export deals with other developing countries in the future.¶ ¶ Last year, both Germany and Switzerland decided to gradually phase out nuclear power. Furthermore, any nuclear project in the United States has become much more difficult to finance and license. Even France, the most nuclear reliant major economy, has already expressed its intention to increase the share of renewables in its electricity mixture. Such dim prospects for nuclear power in developed countries may lead international nuclear companies to look to developing countries – especially China – for business opportunities.¶ ¶ Related, if more nuclear power plants are built in developing countries with little experience of operating a reactor, or bordering a region where terrorism is a concern, or without sufficient financial resources to import state of the art technology, then the chance of a major nuclear accident hitting the developing world will loom large in the coming decades. Not surprisingly, the ability of the Chinese government to resist short-term geopolitical and economic temptation and stop exporting outdated nuclear reactors to other developing countries will have profound safety implications in a post-Fukushima world.¶ ¶ Nuclear emergency planning, meanwhile, is important in ensuring the safety of nuclear power plants. Yet due to concerns about cost escalation and the unwillingness to scare the general public, both national governments and nuclear power companies often ignore the worst-case scenarios of nuclear accidents when facility-specific emergency plans are prepared and exercised. For instance, although 25 years have passed since the Chernobyl disaster, the Fukushima nuclear crisis still caught both the Japanese government and the plant operator entirely unprepared. ¶ ¶ When China’s first national nuclear emergency drill was held at Tianwan Nuclear Power Plant in November 2009, authorities simply assumed that an effective emergency response would be sufficient to contain the hypothetic accident. However, after Three Mile Island in 1979, Chernobyl in 1986 and Fukushima Daiichi in 2011, it becomes increasingly difficult for the Chinese government and state-owned nuclear power companies to continue to not prepare emergency plans for worst-case nuclear accidents that have already befallen major nuclear economies in the past. ¶ ¶ Given the devastating impacts of major nuclear accidents, and the tarred safety record of global nuclear industry, the Chinese government should prioritize its nuclear safety agenda by fundamentally reforming its nuclear oversight mechanism and continuously improving transparency of its nuclear industry. Instead of actively advocating an overly ambitious nuclear target by 2020, Chinese nuclear power companies should build and indigenize imported third generation nuclear reactors step by step. Finally, the Chinese government needs to continue to suspend the approval of new nuclear power plants until China gains sufficient experience to operate and improve advanced reactors that are still under construction. Otherwise, deficiencies in the insufficiently tested prototype reactors could be easily built into a hastily ordered nuclear generation fleet, which is a fatal mistake that energy-thirsty China can’t afford to make.

#### Loose nukes cause nuclear war

Wright 7

prize winning author of best winning books. Visiting scholar at The University of Pennsylvania and Schwartz Senior Fellow at the New America Foundation. Attended TCU, finished his interdisciplinary degree in public and international affairs at Princeton (Robert, 4/28, Planet Of The Apes, http://select.nytimes.com/2007/04/28/opinion/28wright.html, AG)

(3) Terrorism. Alas, the negative-feedback loop — bad outcomes lead to smart policies — may not apply here. We reacted to 9/11 by freaking out and invading one too many countries, creating more terrorists. With the ranks of terrorists growing — amid evolving biotechnology and loose nukes — we could within a decade see terrorism on a scale that would make us forget any restraint we had learned from the Iraq war’s outcome. If 3,000 deaths led to two wars, how many wars would 300,000 deaths yield? And how many new terrorists? ¶ Terrorism alone won’t wipe out humanity. But with our unwitting help, it could strengthen other lethal forces. ¶ It could give weight to the initially fanciful “clash of civilizations” thesis. Muslim states could fall under the control of radicals and opt out of what might otherwise have become a global civilization. Armed with nukes (Pakistan already is), they would revive the nuclear Armageddon scenario. A fissure between civilizations would also sabotage the solution of environmental problems, and the ensuing eco-calamity could make people on both sides of the fissure receptive to radical messages. The worse things got, the worse they’d get. ¶ So while no one of the Big Three doomsday dynamics is likely to bring the apocalypse, they could well combine to form a positive-feedback loop, aka the planetary death spiral. And the catalyst would be terrorism, along with our mishandling of it.

### Solvency

#### DoD acquisition of SMR’s ensures rapid military adoption, commercialization, and U.S. leadership

Andres and Breetz 11

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

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

#### Military procurement solves commercial use and avoids regulations

Andres and Loudermilk 10

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Unlike private industry, **the military does not face the same regulatory and congressional hurdles to constructing reactors and would have an easier time in adopting them for use**. **By integrating small nuclear reactors as power sources for domestic U.S. military bases, three potential energy dilemmas are solved at the same time**. First, by incorporating small reactors at its bases, **the military addresses its own energy security quandary**. **The military has recently sought to “island” its bases in the U.S. -protecting them from grid outages**, be they accidental or intentional. **The Department of Defense has promoted this endeavor through lowering energy consumption on bases and searching for renewable power alternatives, but these measures alone will prove insufficient**. **Small reactors provide sufficient energy output to power military installations** and in some cases surrounding civilian population centers.¶ **Secondly, as the reactors become integrated on military facilities, the stigma on the nuclear power industry will ease and inroads will be created for the adoption of small-scale reactors as a viable source of energy. Private industry and the public will see that nuclear reactors can indeed be utilized safely and effectively, resulting in a renewed push toward the expansion of nuclear power**. Although many of the same hurdles will still be in place, **a shift in public opinion and a stronger effort by utilities, coupled with the demonstrated success of small reactors on military bases, could prove the catalysts necessary for the federal government and the NRC to take more aggressive action**.¶ Finally, while new reactors are not likely in the near future**, the military’s actions will preserve, for a while longer, the badly ailing domestic nuclear energy industry. Nuclear power is here to stay around the globe, and the United States has an opportunity to take a leading role in supplying the world’s nuclear energy and reactor technology.** With the U.S. nuclear industry dormant for three decades, much of the attention, technology, and talent have concentrated overseas in countries with a strong interest in nuclear technology. **Without the United States as a player in the nuclear energy market, it has little say over safety regulations of reactors or the potential risks of proliferation from the expansion of nuclear energy. If the current trend continues, the U.S. will reach a point where it is forced to import nuclear technology and reactors from other countries. Action by the military to install reactors on domestic bases will both guarantee the survival of the American nuclear industry in the short term, and work to solidify support for it in the long run.**¶ Ultimately**, between small-scale nuclear reactors and the U.S. military, the capability exists to revitalize America’s sleeping nuclear industry and promoting energy security and clean energy production**. The reactors offer the ability to power domestic military bases, small towns, and other remote locations detached from the energy grid. Furthermore, reactor sites can house multiple units, allowing for greater energy production – rivaling even large reactors. **Small reactors offer numerous benefits to the United States and a path initiated by the military presents a realistic route by which their adoption can be achieved.**

#### SMRs are cost-effective, safe, and can be quickly deployed

Szondy 12

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One way of getting around many of these problems is through the development of small modular reactors (SMR). These are reactors capable of generating about 300 megawatts of power or less, which is enough to run 45,000 US homes. Though small, SMRs are proper reactors. They are quite different from the radio-thermal generators (RTG) used in spacecraft and remote lighthouses in Siberia. Nuclear reactors such as SMRs use controlled nuclear fission to generate power while RTGs use natural radioactive decay to power a relatively simple thermoelectric generator that can only produce, at most, about two kilowatts.¶ In terms of power, RTGs are the equivalent of batteries while small nuclear reactors are only "small" when compared to conventional reactors. They are hardly the sort that you would keep in the garage. In reality, SMR power plants would cover the area of a small shopping mall. Still, such an installation is not very large as power plants go and a reactor that only produces 300 megawatts may not seem worth the investment, but the US Department of Energy is offering US$452 million in matching grants to develop SMRs and private investors like the Bill Gates Foundation and the company of Babcock and Wilcox are putting up money for their own modular reactor projects.¶ The 60-year old breakthrough¶ One reason for government and private industry to take an interest in SMRs is that they've been successfully employed for much longer than most people realize. In fact, hundreds have been steaming around the world inside the hulls of nuclear submarines and other warships for sixty years. They've also been used in merchant ships, icebreakers and as research and medical isotope reactors at universities. There was even one installed in the Antarctic at McMurdo Station from 1962 to 1972. Now they're being considered for domestic use.¶ The case for SMRs¶ SMRs have a number of advantages over conventional reactors. For one thing, SMRs are cheaper to construct and run. This makes them very attractive to poorer, energy-starved countries; small, growing communities that don't require a full-scale plant; and remote locations such as mines or desalination plants. Part of the reason for this is simply that the reactors are smaller. Another is that, not needing to be custom designed in each case, the reactors can be standardized and some types built in factories that are able to employ economies of scale. The factory-built aspect is also important because a factory is more efficient than on-site construction by as much as eight to one in terms of building time. Factory construction also allows SMRs to be built, delivered to the site, and then returned to the factory for dismantling at the end of their service lives - eliminating a major problem with old conventional reactors, i.e. how to dispose of them.¶ SMRs also enjoy a good deal of design flexibility. Conventional reactors are usually cooled by water - a great deal of water - which means that the reactors need to be situated near rivers or coastlines. SMRs, on the other hand, can be cooled by air, gas, low-melting point metals or salt. This means that SMRs can be placed in remote, inland areas where it isn't possible to site conventional reactors.¶ Safety¶ This cooling system is often passive. In other words, it relies more on the natural circulation of the cooling medium within the reactor's containment flask than on pumps. This passive cooling is one of the ways that SMRs can improve safety. Because modular reactors are smaller than conventional ones, they contain less fuel. This means that there's less of a mass to be affected if an accident occurs. If one does happen, there's less radioactive material that can be released into the environment and makes it easier to design emergency systems. Since they are smaller and use less fuel, they are easier to cool effectively, which greatly reduces the likelihood of a catastrophic accident or meltdown in the first place.¶ This also means that accidents proceed much slower in modular reactors than in conventional ones. Where the latter need accident responses in a matter of hours or minutes, SMRs can be responded to in hours or days, which reduces the chances of an accident resulting in major damage to the reactor elements.¶ The SMR designs that reject water cooling in favor of gas, metal or salt have their own safety advantages. Unlike water-cooled reactors, these media operate at a lower pressure. One of the hazards of water cooling is that a cracked pipe or a damaged seal can blow radioactive gases out like anti-freeze out of an overheated car radiator. With low-pressure media, there's less force to push gases out and there's less stress placed on the containment vessel. It also eliminates one of the frightening episodes of the Fukushima accident where the water in the vessel broke down into hydrogen and oxygen and then exploded.¶ Another advantage of modular design is that some SMRs are small enough to be installed below ground. That is cheaper, faster to construct and less invasive than building a reinforced concrete containment dome. There is also the point that putting a reactor in the ground makes it less vulnerable to earthquakes. Underground installations make modular reactors easier to secure and install in a much smaller footprint. This makes SMRs particularly attractive to military customers who need to build power plants for bases quickly. Underground installation also enhances security with fewer sophisticated systems needed, which also helps bring down costs.¶ SMRs can help with proliferation, nuclear waste and fuel supply issues because, while some modular reactors are based on conventional pressurized water reactors and burn enhanced uranium, others use less conventional fuels. Some, for example, can generate power from what is now regarded as "waste", burning depleted uranium and plutonium left over from conventional reactors. Depleted uranium is basically U-238 from which the fissible U-235 has been consumed. It's also much more abundant in nature than U-235, which has the potential of providing the world with energy for thousands of years. Other reactor designs don't even use uranium. Instead, they use thorium. This fuel is also incredibly abundant, is easy to process for use as fuel and has the added bonus of being utterly useless for making weapons, so it can provide power even to areas where security concerns have been raised.¶ But there's still the sticking point that modular reactors are, by definition, small. That may be fine for a submarine or the South Pole, but what about places that need more? Is the alternative conventional nuclear plants? It turns out that the answer is no. Modular reactors don't need to be used singly. They can be set up in batteries of five or six or even more, providing as much power as an area needs. And if one unit needs to be taken off line for repairs or even replacement, it needn't interfere with the operation of the others.

#### Incentives now, but they are insufficient

DoD Energy Blog 11

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

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

#### Nuclear power is inevitable

IAEA applications

Middle class

Population growth

Urbanization

Warming

Desal

Ebinger and Squassoni 11

Charles K Ebinger and Sharon Squassoni 11, Charles is senior fellow and director of the Energy Security Initiative at the Brookings Institution, Sharon is senior fellow and director of the Proliferation Prevention Program at the Center for Strategic and International Studies, “Industry and Emerging Nuclear Energy Markets” in “Business and Nonproliferation”, googlebooks

As mentioned previously, a notable feature of the nuclear renaissance is the widespread interest in nuclear power, especially in countries without a commercial nuclear infrastructure. According to the International Atomic Energy Agency (IAEA), at least sixty-five countries have expressed such interest, most from outside the industrialized economies of the Organization of Economic Cooperation and Development (OECD), the main locus of nuclear power capacity at present. Most of the capacity growth up to 2030 is expected to occur in the Middle East, South Asia, Southeast Asia, and the Far East. As part of this growth, eleven developing countries are serious candidates for first reactors, although progress in carrying out their plans varies widely (see table 4-1). These countries are drawing new suppliers into the nuclear market (notably China, India, and South Korea) and sparking activity among existing suppliers such as Russia and Japan. Overall, however, many countries will not be able to follow through on growth plans owing to cost, limited grid capacity, and perhaps public resistance. Countries are moving toward nuclear energy, not the mention other sources of primary fuel, in large part because of mounting demand: between 2008 and 2035 global electricity consumption is expected to increase 80 percent, and 80 percent of that growth will take place in non-OECD countries. Underlying this large increase in electricity demand are population growth, urbanization, concerns about CO2 emissions from fossil fuel combustion, energy security, and pressure from a growing middle class for goods and services using or produced by electricity. Over this period, global population will rise from 6.7 billion to 8.5 billion, with 7.2 billion of the total living in non-OECD countries. Most of this increase will take place in China, India, and the Middle East, with the balance in the rest of the developing world, while the share of the global population in the OECD and Russia will decline. Today nearly 1.4 billion people have no electricity, a figure that may well increase with further population growth, despite movement into the modern energy economy. Urbanization will undoubtedly push demand up as well. For the first time in history, a majority of the world’s population is living in urban areas, a trend likely to continue, especially in developing countries. With the movement of hundreds of millions of people from rural areas to cities, more communities will turn from traditional and often free fuels (wood, forest residues, agricultural wastes, bagasse, and dung) to modern fuels such as electricity, natural gas, and petroleum products. The dramatic growth of the middle class in a number of emerging market nations is also having a large impact on energy consumption. The World Bank predicts that by 2030 the middle class in these nations will jump to 1.2 billion from 430 million in 2000. It is estimated that in India alone, a country that before Fukushima was developing plans for nuclear power, the number of households with an annual disposal income of $5,000-$15,000 will increase from 36 percent of the population in 2010 to more than 58 percent by 2020. Climate change, too, will have some of its largest impact in developing countries, which, according to the International Energy Agency (IEA), will be responsible for nearly all of the projected global increase in CO2 emissions by 2035. In large part, the cause of this rise is coal-fired power in China and India. The urgency of finding alternatives to coal is recognized by others as well, including Indonesia, Pakistan, Poland, South Africa, and Russia. Compared with developed countries, developing nations rely far more on imported fossil fuels, especially oil, to generate power. When the price of oil on the world market rose to $147 a barrel in 2008, it became clear that dependence on imported fossil fuels for electricity generation can destroy a nation’s economy and that fuel diversification is vital for energy security. As prices climbed beyond $100 a barrel, Jordan, a country committed to introducing civilian nuclear energy, was particularly hard hit: 99 percent of its electricity is generated from either oil or gas, 96 percent of which is imported. Developing countries also see nuclear energy as a possible source of power for desalination plants, especially in the Gulf Cooperation Council (GCC) countries and elsewhere in the Middle East. As the demand for freshwater supplies increases – along with the emphasis on limited the use of fossil fuels to generates electricity because of the impact of emissions, price volatility, and supply disruptions – the nuclear option will be considered even more viable. Moreover, some countries with large resources of oil or gas, such as the United Arab Emirates (UAE) and Saudi Arabia, are hoping nuclear power will help reduce their domestic use of these fuels in generating power and will boost the financial benefits of exporting them. For some developing countries, status and geopolitics are undoubtedly important factors in considering the development or expansion of a civilian nuclear energy program. In the view of Turkey’s energy minister Hilmi Guler, for instance, nuclear technology is a requirement for a seat at the table with the ten most developed countries in the world.

#### We have the personnel

ITA 11

(International Trade Administration, “The Commercial Outlook for U.S. Small Modular Nuclear Reactors” Manufacturing and Services Competitiveness Report, February 2011, US Department of Commerce)

A serious obstacle to the resurgence of traditional nuclear power in the United States is the eroded domestic manufacturing capacity for the major nuclear components. A robust program of building SMRs, however, could make use of existing domestic capacity that is already capable of completely constructing most proposed SMR designs. SMRs would not require the ultra-heavy forgings that currently can only be made overseas. U.S. suppliers say that firms could retool using existing capabilities and resources and could source most of the components of SMRs here in the United States. This ability could mean tremendous new commercial opportunities for U.S. firms and workers.¶ A substantial SMR deployment program in the United States could result in the creation of many new jobs in manufacturing, engineering, transportation, construction (for site preparation and installation) and craft labor, professional services, and ongoing plant operations. As SMR manufacturers prove their designs in the domestic market, they will likely consider export opportunities. The modular nature of SMRs and their relative portability means that locating export-oriented SMR manufacturing and assembly could make sense for U.S. companies, as opposed to the localiza-tion that is typically necessary for building larger reactors

#### And the expertise

Cohen 12

Armond Cohen 12, Executive Director of the Clean Air Task Force, “DoD: A Model for Energy Innovation?”, May 29, <http://www.catf.us/blogs/ahead/2012/05/29/dod-a-model-for-energy-innovation/>

Unlike most other agencies, including the Energy Department, the Pentagon is the ultimate customer for the new technology it helps create, spending some $200 billion each year on R&D and procurement. The implications of DoD’s role as customer have not been widely appreciated, as: · DoD, uniquely in government, supports multi-year, billion-dollar “end to end” innovation efforts that produce technology that is continuously tested, deployed and refined on bases and in the field, providing real world feedback that leads to increases in performance and reductions in cost. By contrast, most of the federal government’s civilian energy innovation efforts involve research loosely connected at best with the few commercialization efforts that it supports. · DoD and its contractors know how to bring together multiple innovations to achieve system-level advances leading to big performance gains (examples range from nuclear submarines to unmanned aircraft to large-scale information systems). This systems approach is precisely what is needed to advance clean energy technologies. · Relatively stable, multi-year funding allows the Pentagon to pursue “long cycle” innovation that is necessary for large, capital- intensive technologies and supports a highly capable contractor base that can respond to changing national security demands. · The Pentagon’s scope and budget has allowed it to experiment with new and creative innovation tools such as the well-known Defense Advanced Projects Research Agency, which has produced extraordinary technological breakthroughs; and the Environmental Security Technology Certification Program, which develops and demonstrates cost-effective improvements in environmental and energy technologies for military installations and equipment. · Because of DoD’s size and demands for performance and reliability, it is unique among government and private sector organizations as a demonstration test-bed. Smart-grid technologies and advanced energy management systems for buildings are already poised to benefit from this aspect of the Pentagon’s innovation system. · DoD has collaborated effectively with other federal agencies, including the Department of Energy and its predecessors (for example, to advance nuclear energy technologies). Continuing competition and cooperation between DoD and DOE will spur energy innovation.  DoD’s innovation capabilities can enhance U.S. national security, improve U.S. international competitiveness, and spur global energy restructuring and greenhouse gas emissions reductions. At the same time, while providing enormous opportunities to develop and test energy efficiency technologies and small scale distributed energy appropriate to forward bases, the Pentagon is unlikely to become an all-purpose hub for advancing all categories of clean-energy technologies, because its energy innovation activities will be sustainable only where they can support the nation’s defense capabilities. Therefore, many other large-scale technologies that are of great importance to improving the environment, such as carbon-free central station generation or zero carbon transportation, may not as easily fit with DoD’s mission. Possible exceptions might include small modular nuclear reactors that can be used for producing independent, non-grid power at military bases, or, conceivably, zero-carbon liquid fuels other than anything resembling current generation biofuels.

#### And there are 3 demo projects in progress, but no incentives

**ANA 12**

(Alliance for Nuclear Accountability, “ Documents Reveal Time-line and Plans for “Small Modular Reactors” (SMRs) at the Savannah River Site (SRS) Unrealistic and Promise no Funding” June 8, 2012, <http://www.ananuclear.org/Issues/PlutoniumFuelMOX/tabid/75/articleType/ArticleView/articleId/558/Default.aspx>)

“While SRS may superficially appear to present certain attractive aspects for the location of SMRs, the site has not had experience with operation of nuclear reactors in over twenty years and has no current expertise in reactor operation,” said Clements. “While DOE is set to chose two SMR designs to fund for further development, SRS affirms that no construction funds will be provided, leaving vendors with the difficult and perhaps insurmountable task to find private funding for SMR construction.”¶ Two of the three separate “Memoranda of Agreement” for three different and still hypothetical SMR designs include deployment timelines which are already admitted by DOE to be inaccurate since they were signed less than six months ago.

#### Obama is pushing for SMRs

New York Times 11

(Matthew L. Wald, “Administration to Push for Small ‘Modular’ Reactors” <http://www.nytimes.com/2011/02/13/science/earth/13nuke.html?_r=3>, SEH)

The Obama administration’s 2012 budget proposal will include a request for money to help develop small “modular” reactors that would be owned by a utility and would supply electricity to a government lab, people involved in the effort say. The department is hoping for $500 million over five years, half of the estimated cost to complete two designs and secure the Nuclear Regulatory Commission’s approval. The reactors would be built almost entirely in a factory and trucked to a site like modular homes.¶ In promoting the reactor, the administration’s immediate goal is to help the Energy Department meet a federal target for reducing its carbon dioxide emissions by relying more on clean energy and less on gas and coal. Like other federal agencies, the department is required by an executive order to reduce its carbon footprint by 28 percent by 2020.

#### Life should be valued as apriori – it precedes the ability to value anything else

Kacou 8

Amien Kacou. 2008. WHY EVEN MIND? On The A Priori Value Of “Life”, Cosmos and History: The Journal of Natural and Social Philosophy, Vol 4, No 1-2 (2008) cosmosandhistory.org/index.php/journal/article/view/92/184

Furthermore, that manner of **finding things good** that is in pleasure **can certainly not exist in any world without consciousness (i.e., without “life,”** as we now understand the word)—slight analogies put aside. In fact, we can begin to develop a more sophisticated definition of the concept of “pleasure,” in the broadest possible sense of the word, as follows: it is the common psychological element in all psychological experience of goodness (be it in joy, admiration, or whatever else). In this sense, pleasure can always be pictured to “mediate” all awareness or perception or judgment of goodness: there is pleasure in all consciousness of things good; pleasure is the common element of all conscious satisfaction. In short, it is simply the very experience of liking things, or the liking of experience, in general. In this sense, **pleasure is, not only uniquely characteristic of life but also, the core expression of goodness in life—the most general sign or phenomenon for favorable conscious valuation**, in other words. This does not mean that “good” is absolutely synonymous with “pleasant”—what we value may well go beyond pleasure. (The fact that we value things needs not be reduced to the experience of liking things.) However, what we value beyond pleasure remains a matter of speculation or theory. Moreover, we note that a variety of things that may seem otherwise unrelated are correlated with pleasure—some more strongly than others. In other words, there are many things the experience of which we like. For example: the admiration of others; sex; or rock-paper-scissors. But, again, what they are is irrelevant in an inquiry on a priori value—what gives us pleasure is a matter for empirical investigation. Thus, we can see now that, in general, **something primitively valuable is attainable in living—that is, pleasure itself.** And it seems equally clear that we have a priori logical reason to pay attention to the world in any world where pleasure exists. Moreover, **we can now also articulate a foundation for a security interest in our life: since the good of pleasure can be found in living** (to the extent pleasure remains attainable),[17] **and only in living, therefore, a priori, life ought to be continuously (and indefinitely) pursued at least for the sake of preserving the possibility of finding that good.** However, this platitude about the value that can be found in life turns out to be, at this point, insufficient for our purposes. It seems to amount to very little more than recognizing that our subjective desire for life in and of itself shows that life has some objective value. For what difference is there between saying, “living is unique in benefiting something I value (namely, my pleasure); therefore, I should desire to go on living,” and saying, “I have a unique desire to go on living; therefore I should have a desire to go on living,” whereas the latter proposition immediately seems senseless? In other words, “life gives me pleasure,” says little more than, “I like life.” Thus, we seem to have arrived at the conclusion that **the fact that we already have some (subjective) desire for life shows life to have some (objective) value.** But, if that is the most we can say, then it seems our enterprise of justification was quite superficial, and the subjective/objective distinction was useless—for all we have really done is highlight the correspondence between value and desire. Perhaps, our inquiry should be a bit more complex.