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## plan

#### The United States Federal Government should obtain, through alternative financing, electricity from small modular reactors for military bases in the United States.

## dod adv

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

Robitaille 12

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

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

#### Those communication breakdowns go nuclear

Andres and Breetz 11

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)

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

#### Grid collapse decimates drone operations

Davenport and Dreazen 11

(Coral Davenport and Yochi J. Dreazen, energy correspondents at the National Journal, “The Green Lantern” May 27, 2011, http://www.nationaljournal.com/reporters/bio/18)

Meanwhile, the Defense Department is also confronting a new world of energy-security threats—and clean-energy opportunities—in the form of domestic military bases that rely on the fragile, aging U.S. electric grid for power. Over the past two years, a slew of studies have raised alarms about the vulnerability of the nation’s commercial electric grid, which is more than a century old in some parts of the country. A 2008 study by a Defense Science Board task force on the Pentagon’s energy strategy concluded that U.S. military bases rely almost exclusively on “outside the fence” commercial power, which is “remarkably fragile” and a highly attractive target for terrorist attacks. Yet increasingly, the military is conducting remote warfare abroad from bases at home, such as Nevada’s Creech Air Force Base, which operates the Predator drones over Iraq and Afghanistan. Creech is “deeply vulnerable to blackouts and cyberattacks,” according to Dorothy Robyn, the deputy undersecretary of Defense for installations and the environment. According to the Defense Science Board, the Pentagon’s reliance on the commercial grid puts missions at risk. “A power failure at a military base here at home could threaten our operations abroad,” Robyn said. So energy officers at military bases are working to turn their facilities into “island microgrids”—entities that can generate and store their own electricity, independent of the surrounding commercial grid. The base grid is plugged into the bigger grid, but in the event of a blackout, it could continue to function on electricity generated on-site—largely from renewable sources. These include utility-scale solar arrays, backed up with advance-battery solar-power storage units and diesel generators—along the lines of the two small, all-solar bases operating in Afghanistan’s Helmand province. Energy experts say that the military’s approach could also offer a new model for towns and cities, protecting them from regional-grid blackouts—and boosting local renewable-energy production.

#### Solves terrorism

Daniel L. **Byman 11**, Director of Research at the Saban Center for Middle East Policy at Brookings, “Denying Terrorist Safe Havens: Homeland Security Efforts to Counter Threats from Pakistan, Yemen and Somalia”, June 3, <http://www.brookings.edu/testimony/2011/0603_terrorism_byman.aspx>

The U.S. drone campaign against al Qaeda, begun under Bush and put on steroids under Obama, has taken out dozens of al Qaeda figures, primarily in Pakistan. In 2010, the United States launched over 100 drone attacks in Pakistan, according to the New America Foundation.[11] Those killed were far less prominent than bin Laden, but in many cases their skills were in short supply and difficult to replace. Al Qaeda struggles to find seasoned and skilled new leaders, and even when it can it takes time to integrate them into the organization. Even more important, but even harder to see, al Qaeda lieutenants must limit communications to stop U.S. eavesdropping that could lead to airstrikes, reduce their circle of associates to avoid spies, and avoid public exposure, all of which make them far less effective as leaders. This makes it harder, though not impossible, for them to pull off sophisticated attacks that require long-term planning. Although innocent civilians do die in these attacks, the number of non-combatant deaths is often exaggerated and has been declining. According to Peter Bergen and Katherine Tiedemann, “According to our estimates, the nonmilitant fatality rate since 2004 is approximately 25 percent, and in 2010, the figure has been more like 6 percent -- an improvement that is likely the result of increased numbers of U.S. spies in Pakistan's tribal areas, better targeting, more intelligence cooperation with the Pakistani military, and smaller missiles.”[12] Such innocent deaths are still considerable, and errant strikes have the potential to worsen U.S.-Pakistan relations, but drone strikes are often far less bloody than alternatives such as Pakistani military attacks or U.S. attacks by manned fixed-wing aircraft. In addition, drone strikes involve no risk of U.S. personnel. Killing terrorist group lieutenants on a large scale can devastate a group. There may still be thousands of people who hate the United States and want to take up arms, but without bomb-makers, passport-forgers, and leaders to direct their actions they are often reduced to menacing bumblers, easier to disrupt and often more a danger to themselves than to their enemies.

#### That’s nuclear terror

Us Russia Joint Threat Assessment May 11

http://belfercenter.ksg.harvard.edu/files/Joint-Threat-Assessment%20ENG%2027%20May%202011.pdf

 ABOUT THE U.S.-RUSSIA JOINT THREAT ASSESSMENT ON NUCLEAR TERRORISM The U.S.-Russia Joint Threat Assessment on Nuclear Terrorism is a collaborative project of Harvard University’s Belfer Center for Science and International Affairs and the U.S.A. and Canada Studies Institute of the Russian Academy of Sciences led by Rolf Mowatt-Larssen and Pavel Zolotarev. Authors: • Matthew Bunn. Associate Professor of Public Policy at Harvard Kennedy School and Co-Principal Investigator of Project on Managing the Atom at Harvard University’s Belfer Center for Science and International Affairs. • Colonel Yuri Morozov (retired Russian Armed Forces). Professor of the Russian Academy of Military Sciences and senior fellow at the U.S.A and Canada Studies Institute of the Russian Academy of Sciences, chief of department at the General Staff of the Russian Armed Forces, 1995–2000. • Rolf Mowatt-Larssen. Senior fellow at Harvard University’s Belfer Center for Science and International Affairs, director of Intelligence and Counterintelligence at the U.S. Department of Energy, 2005–2008. • Simon Saradzhyan. Fellow at Harvard University’s Belfer Center for Science and International Affairs, Moscow-based defense and security expert and writer, 1993–2008. • William Tobey. Senior fellow at Harvard University’s Belfer Center for Science and International Affairs and director of the U.S.-Russia Initiative to Prevent Nuclear Terrorism, deputy administrator for Defense Nuclear Nonproliferation at the U.S. National Nuclear Security Administration, 2006–2009. • Colonel General Viktor I. Yesin (retired Russian Armed Forces). Senior fellow at the U.S.A and Canada Studies Institute of the Russian Academy of Sciences and advisor to commander of the Strategic Missile Forces of Russia, chief of staff of the Strategic Missile Forces, 1994–1996. • Major General Pavel S. Zolotarev (retired Russian Armed Forces). Deputy director of the U.S.A and Canada Studies Institute of the Russian Academy of Sciences and head of the Information and Analysis Center of the Russian Ministry of Defense, 1993–1997, deputy chief of staff of the Defense Council of Russia, 1997–1998. Contributor: • Vladimir Lukov, director general of autonomous non-profit organization “Counter-Terrorism Center.”

The expert community distinguishes pathways terrorists might take to the bomb (discussed in detail in the next section of the report). One is the use of a nuclear weapon that has been either stolen or bought on the black market. The probability of such a development is very low, given the high levels of physical security (guards, barriers, and the like) and technical security (electronic locks and related measures) of modern nuclear warheads. But we cannot entirely rule out such a scenario, especially if we recall the political instability in Pakistan, where the situation could conceivably develop in a way that would increase the chance that terrorist groups might gain access to a Pakistani nuclear weapon A second pathway is the use of an improvised nuclear device built either by terrorists or by nuclear specialists that the terrorists have secretly recruited, with use of weapons-usable fissile material either stolen or bought on the black market.1 The probability of such an attack is higher than using stolen nuclear warheads, because the acceleration of technological progress and globalization of information space make nuclear weapons technologies more accessible while the existence of the nuclear black market eases access of terrorists to weapons-usable fissile materials. A third pathway is the use of an explosive nuclear device built by terrorists or their accomplices with fissile material that they produced themselves—either highly enriched uranium (HEU) they managed to enrich, or plutonium they managed to produce and reprocess. Al-Qaeda and associated groups appear to have decided that enriching uranium lies well beyond the capabilities that they would realistically be able to develop. A fourth pathway is that terrorists might receive a nuclear bomb or the materials needed to make one from a state. North Korea, for example, has been willing to sell its missile technology to many countries, and transferred its plutonium production reactor technology to Syria, suffering few consequences as a result. Transferring the means to make a nuclear bomb to a terrorist group, however, would be a dramatically different act, for the terrorists might use that capability in a way that could provoke retaliation that would result in the destruction of the regime. A far more worrisome transfer of capability from state to group could occur without the witting cooperation of the regime. A future A.Q. Khan-type rogue nuclear supplier network operating out of North Korea or out of a future nuclear-armed Iran could potentially transfer such a capability to a surrogate group and/or sell it for profit to the highest bidder. Global trends make nuclear terrorism a real threat. Although the international community has recognized the dangers of nuclear terrorism, it has yet to develop a comprehensive strategy to lower the risks of nuclear terrorism. Major barriers include complacency about the threat and the adequacy of existing nuclear security measures; secrecy that makes it difficult for states to share information and to cooperate; political disputes; competing priorities; lack of funds and technical expertise in some countries; bureaucratic obstacles; and the sheer difficulty of preventing a potentially small, hard-to-detect team of terrorists from acquiring a small, hard-to-detect chunk of nuclear material with which to manufacture a crude bomb. These barriers must not be allowed to stand in the way of the panhuman universal priority of preventing this grave threat from materializing. If current approaches toward eliminating the threat are not replaced with a sense of urgency and resolve, the question will become not if, but when, where, and on what scale the first act of nuclear terrorism occurs.

#### Extinction

**Ayson 10**, Robert Ayson, Professor of Strategic Studies and Director of the Centre for Strategic Studies: New Zealand at the Victoria University of Wellington, 2010 (“After a Terrorist Nuclear Attack: Envisaging Catalytic Effects,” Studies in Conflict & Terrorism, Volume 33, Issue 7, July, Available Online to Subscribing Institutions via InformaWorld)

But these two nuclear worlds—a non-state actor nuclear attack and a catastrophic interstate nuclear exchange—are not necessarily separable. It is just possible that some sort of terrorist attack, and especially an act of nuclear terrorism, could precipitate a chain of events leading to a massive exchange of nuclear weapons between two or more of the states that possess them. In this context, today’s and tomorrow’s terrorist groups might assume the place allotted during the early Cold War years to new state possessors of small nuclear arsenals who were seen as raising the risks of a catalytic nuclear war between the superpowers started by third parties. These risks were considered in the late 1950s and early 1960s as concerns grew about nuclear proliferation, the so-called n+1 problem. It may require a considerable amount of imagination to depict an especially plausible situation where an act of nuclear terrorism could lead to such a massive inter-state nuclear war. For example, in the event of a terrorist nuclear attack on the United States, it might well be wondered just how Russia and/or China could plausibly be brought into the picture, not least because they seem unlikely to be fingered as the most obvious state sponsors or encouragers of terrorist groups. They would seem far too responsible to be involved in supporting that sort of terrorist behavior that could just as easily threaten them as well. Some possibilities, however remote, do suggest themselves. For example, how might the United States react if it was thought or discovered that the fissile material used in the act of nuclear terrorism had come from Russian stocks,40 and if for some reason Moscow denied any responsibility for nuclear laxity? The correct attribution of that nuclear material to a particular country might not be a case of science fiction given the observation by Michael May et al. that while the debris resulting from a nuclear explosion would be “spread over a wide area in tiny fragments, its radioactivity makes it detectable, identifiable and collectable, and a wealth of information can be obtained from its analysis: the efficiency of the explosion, the materials used and, most important … some indication of where the nuclear material came from.”41 Alternatively, if the act of nuclear terrorism came as a complete surprise, and American officials refused to believe that a terrorist group was fully responsible (or responsible at all) suspicion would shift immediately to state possessors. Ruling out Western ally countries like the United Kingdom and France, and probably Israel and India as well, authorities in Washington would be left with a very short list consisting of North Korea, perhaps Iran if its program continues, and possibly Pakistan. But at what stage would Russia and China be definitely ruled out in this high stakes game of nuclear Cluedo? In particular, if the act of nuclear terrorism occurred against a backdrop of existing tension in Washington’s relations with Russia and/or China, and at a time when threats had already been traded between these major powers, would officials and political leaders not be tempted to assume the worst? Of course, the chances of this occurring would only seem to increase if the United States was already involved in some sort of limited armed conflict with Russia and/or China, or if they were confronting each other from a distance in a proxy war, as unlikely as these developments may seem at the present time. The reverse might well apply too: should a nuclear terrorist attack occur in Russia or China during a period of heightened tension or even limited conflict with the United States, could Moscow and Beijing resist the pressures that might rise domestically to consider the United States as a possible perpetrator or encourager of the attack? Washington’s early response to a terrorist nuclear attack on its own soil might also raise the possibility of an unwanted (and nuclear aided) confrontation with Russia and/or China. For example, in the noise and confusion during the immediate aftermath of the terrorist nuclear attack, the U.S. president might be expected to place the country’s armed forces, including its nuclear arsenal, on a higher stage of alert. In such a tense environment, when careful planning runs up against the friction of reality, it is just possible that Moscow and/or China might mistakenly read this as a sign of U.S. intentions to use force (and possibly nuclear force) against them. In that situation, the temptations to preempt such actions might grow, although it must be admitted that any preemption would probably still meet with a devastating response.

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

King 11

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

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

#### DoD bypasses regulatory hurdles and safety hazards

Loudermilk 11

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

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

## water adv

Water scarcity coming now - it's a threat multiplier that enflames hotspots globally. Specifically, Egypt and Central Asia - their defense isn't predictive

Dinar et al 10/18/12

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In short, predictions of a Water World War are overwrought. However, tensions over water usage can still exacerbate other existing regional conflicts. Climate change is expected to intensify droughts, floods, and other extreme weather conditions that jeopardize freshwater quantity and quality and therefore act as a threat-multiplier, making shaky regions shakier. So what river basins constitute the biggest risks today? In a World Bank report we published in 2010 (as well as a subsequent article in a special issue of the Journal of Peace Research) we analyzed the physical effects of climate change on international rivers. We modeled the variability in river annual runoff in the past and for future climate scenarios. We also considered the existence and nature of the institutional capacity around river basins, in the form of international water treaties, to potentially deal with the effects of climate change. According to our research, 24 of the world's 276 international river basins are already experiencing increased water variability. These 24 basins, which collectively serve about 332 million people, are at high risk of water related political tensions. The majority of the basins are located in northern and sub-Saharan Africa. A few others are located in the Middle East, south-central Asia, and South America. They include the Tafna (Algeria and Morocco), the Dasht (Iran and Pakistan), the Congo (Central Africa), Lake Chad (Central Africa), the Niger (Western Africa), the Nile (Northeastern Africa), and the Chira (Ecuador and Peru). There are no strong treaties governing the use of these water reserves in tense territories. Should conflicts break out, there are no good mechanisms in place for dealing with them. By 2050, an additional 37 river basins, serving 83 million people, will be at high risk for feeding into political tensions. As is the case currently, a large portion of these are in Africa. But, unlike today, river basins within Central Asia, Eastern Europe, Central Europe, and Central America will also be at high risk within 40 years. Some of these include the Kura-Araks (Iran, Turkey, and the Caucasus), the Neman (Eastern Europe) Asi-Orontes (Lebanon, Syria, Turkey), and the Catatumbo Basins (Colombia and Venezuela). CROSSING THE NILE Among the larger African basins, the Nile has the greatest implications for regional and global security. Tensions over access to the river already pit Ethiopia and Egypt, two important Western allies, against one another. Egypt has been a major player in the Middle East Peace Process and Ethiopia is an important regional force in the Horn of Africa, currently aiding other African forces to battle Al-Shabbab in Somalia. Over the years, a number of international water treaties have made rules for the basin, but they are largely limited to small stretches of it. In particular, only Egypt and Sudan are party to the 1959 Nile River Agreement, the principal treaty regarding the river. Egypt, which is the furthest downstream yet is one of the most powerful countries in the region, has been able to heavily influence the water-sharing regime. Upstream countries, such as Ethiopia and Burundi, have been left out, hard-pressed to harness the Nile for their own needs. In 1999, with increasingly vitriolic rhetoric between Egypt and Ethiopia sidetracking regional development, the World Bank stepped up its involvement in the basin. It helped create a network of professional water managers as well as a set of investments in a number of sub-basins. Still, the drafting of a new agreement stalled: upstream countries would not compromise on their right to develop water infrastructure while downstream countries would not compromise on protecting their shares. In 2010, Ethiopia signed an agreement with a number of the other upstream countries hoping to balance against Egypt and Sudan. More recently, the country has also announced plans to construct a number of large upstream dams, which could affect the stability of the region. By 2050, the environmental state of the Nile Basin will be even worse. That is why it is important to create a robust and equitable water treaty now. Such a treaty would focus on ways to harness the river's hydropower potential to satiate the energy needs of all the riparian states while maintaining ecosystem health. The construction of dams and reservoirs further upstream could likewise help even out water flows and facilitate agricultural growth. Projects such as these, mitigating damage to ecosystem health and local populations, would benefit all parties concerned and thus facilitate further basin-wide cooperation. UP IN THE ARAL Another water basin of concern is the Aral Sea, which is shared by Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. The basin consists of two major rivers, the Syr Darya and Amu Darya. During the Soviet era, these two rivers were managed relatively effectively. The break-up of the Soviet Union, however, ended that. The major dispute now is between upstream Kyrgyzstan and downstream Uzbekistan over the Syr Darya. During the winter, Kyrgyzstan needs flowing water to produce hydroelectricity whereas Uzbekistan needs to store water to later irrigate cotton fields. The countries have made several attempts to resolve the dispute. In particular, downstream Uzbekistan, which is rich in fuel and gas, has provided energy to Kyrgyzstan to compensate for keeping water in its large reservoirs until the cotton-growing season. Such barter agreements, however, have had limited success because they are easily manipulated. Downstream states might deliver less fuel during a rainy year, claiming they need less water from upstream reservoirs, and upstream states might deliver less water in retaliation. Kyrgyzstan, frustrated and desperate for energy in winter months, plans to build mega hydro-electric plants in its territory. And another upstream state, Tajikistan, is likewise considering hydro-electricity to satiate its own energy needs. Meanwhile, Uzbekistan is building large reservoirs. Although these plans might make sense in the very near term, they are inefficient in the medium and long term because they don't solve the real needs of downstream states for large storage capacity to protect against water variability across time. In fact, both Kyrgyzstan and Uzbekistan, along with Kazakhstan, will see substantial increases in water variability between now and 2050. And so, the need to share the benefits of existing large-capacity upstream reservoirs and coordinate water uses through strong and more efficient inter-state agreements is unavoidable. A stabilized Aral Sea basin would also benefit the United States. With its withdrawal from Afghanistan, Washington has been courting Uzbekistan as a potential alternative ally and provider of stability in the region. The Uzbek government seems willing to host U.S. military bases and work as a counter-weight to Russia. Kyrgyzstan is also an important regional player. The Manas Air Base, the U.S. military installation near Bishkek, is an important transit point. The country is also working with the United States to battle drug trafficking and infiltration of criminal and insurgent groups. Regional instability could disrupt any of these strategic relationships. If the past is any indication, the world probably does not need to worry about impending water wars. But they must recognize how tensions over water can easily fuel larger conflicts and distract states from other important geopolitical and domestic priorities. Since formal inter-state institutions are key to alleviating tensions over shared resources, it would be wise, then, for the involved governments as well as the international community to negotiate sufficiently robust agreements to deal with impending environmental change. Otherwise, freshwater will only further frustrate stability efforts in the world's volatile regions.

#### Those wars go global

Reilly ‘2

(Kristie, Editor for In These Times, a nonprofit, independent, national magazine published in Chicago. We’ve been around since 1976, fighting for corporate accountability and progressive government. In other words, a better world, “NOT A DROP TO DRINK,” <http://www.inthesetimes.com/issue/26/25/culture1.shtml>)

\*Cites environmental thinker and activist Vandana Shiva Maude Barlow and Tony Clarke—probably North America’s foremost water experts

The two books provide a chilling, in-depth examination of a rapidly emerging global crisis. “Quite simply,” Barlow and Clarke write, “unless we dramatically change our ways, between one-half and two-thirds of humanity will be living with severe fresh water shortages within the next quarter-century. … The hard news is this: Humanity is depleting, diverting and polluting the planet’s fresh water resources so quickly and relentlessly that every species on earth—including our own—is in mortal danger.” The crisis is so great, the three authors agree, that the world’s next great wars will be over water. The Middle East, parts of Africa, China, Russia, parts of the United States and several other areas are already struggling to equitably share water resources. Many conflicts over water are not even recognized as such: Shiva blames the Israeli-Palestinian conflict in part on the severe scarcity of water in settlement areas. As available fresh water on the planet decreases, today’s low-level conflicts can only increase in intensity.

#### And nuclear

Weiner ‘90

(Jonathan, Visiting Professor of Molecular Biology at Princeton University. The Next One Hundred Years: Shaping the Fate of Our Living Earth, p. 214)

If we do not destroy ourselves with the A-bomb and the H-bomb, then we may destroy ourselves with the C-bomb, the Change Bomb. And in a world as interlinked as ours, one explosion may lead to the other. Already in the Middle East, from North Africa to the Persian Gulf and from the Nile to the Euphrates, tensions over dwindling water supplies and rising populations are reaching what many experts describe as a flashpoint. A climate shift in the single battle-scarred nexus might trigger international tensions that will unleash some of the 60,000 nuclear warheads the world has stockpiled since Trinity.

#### Indo-Pak water scarcity’s coming – causes escalatory disputes

Nitish Priyadarshi 12, lecturer in the department of environment and water management at Ranchi University in India, “War for water is not a far cry”, June 16, <http://www.cleangangaportal.org/node/44>

Such is the deep nexus between water and global warming that the increased frequency of climate change-driven extreme weather events like hurricanes, droughts and flooding, along with the projected rise of ocean levels, is likely to spur greater interstate and intrastate migration- especially of the poor and the vulnerable- from delta and coastal regions to the hinterland.

As the planet warms, water grow scarcer. Global warming will endanger the monsoon, which effects much greater than those of drought alone-particularly in India given that 70 percent of India’s rainfall comes from the monsoon.

The declining snow cover and receding glaciers in the Himalayan state of Jammu and Kashmir could trigger renewed hostilities between India and Pakistan, neighbouring states in the South Asian region that are at odds on a host of issues.

The two countries share the Indus River, one of the longest rivers in the world. The river rises in southwestern Tibet and flows northwest through the Himalayas. It crosses into the Kashmir region, meandering to the Indian and Pakistani administered areas of the territory.

Pakistan and India have long been embroiled in a territorial dispute over Kashmir, but have so far managed to uphold a World Bank-mediated Indus Water Treaty (IWT) that provides mechanisms for resolving disputes over water sharing. Any drastic reduction in the availability of water in the region has the potential of causing a war between the hostile south Asian neighbors.

The Indus water system is the lifeline for Pakistan, as 75 to 80 percent of water flows to Pakistan as melt from the Himalayan glaciers. This glacier melt forms the backbone of irrigation network in Pakistan, with 90 percent of agricultural land being fed by the vastly spread irrigation network in Pakistan, one of the largest in the world. Any disruption of water flow would cause a grave impact on agriculture produce in Pakistan.

The Indus Waters Treaty is a water-sharing treaty between the Republic of India and Islamic Republic of Pakistan, brokered by the World Bank (then the International Bank for Reconstruction and Development). The treaty was signed in Karachi on September 19, 1960 by Indian Prime Minister Jawaharlal Nehru and President of Pakistan Mohammad Ayub Khan. The treaty was a result of Pakistani fear that since the source rivers of the Indus basin were in India, it could potentially create droughts and famines in Pakistan, especially at times of war. However, India did not revoke the treaty during any of three later Indo-Pakistani Wars.

Until now, the Indus Water Treaty has worked well, but the impact of climate change would test the sanctity of this treaty. Under the treaty signed in 1960, the two countries also share five tributaries of the Indus river, namely, Jhelum, Chenab, Ravi, Beas and Sutlej. The agreement grants Pakistan exclusive rights over waters from the Indus and its westward-flowing tributaries, the Jhelum and Chenab, while the Ravi, Beas and Sutlej rivers were allocated for India’s use.

Transboundary water sharing between India and Pakistan will become an extremely difficult proposition as surface water would become a scarce commodity with the depletion of water reserves up in the mountains.

The sharing of the Ganges waters is a long-standing issue between India and Bangladesh over the appropriate allocation and development of the water resources of the Ganges River that flows from northern India into Bangladesh. The issue has remained a subject of conflict for almost 35 years, with several bilateral agreements and rounds of talks failing to produce results.

#### Goes nuclear

Zahoor ‘11

(Musharaf, is researcher at Department of Nuclear Politics, National Defence University, Islamabad, “Water crisis can trigger nuclear war in South Asia,” <http://www.siasat.pk/forum/showthread.php?77008-Water-Crisis-can-Trigger-Nuclear-War-in-South-Asia>, AM)

South Asia is among one of those regions where water needs are growing disproportionately to its availability. The high increase in population besides large-scale cultivation has turned South Asia into a water scarce region. The two nuclear neighbors Pakistan and India share the waters of Indus Basin. All the major rivers stem from the Himalyan region and pass through Kashmir down to the planes of Punjab and Sindh empty into Arabic ocean. It is pertinent that the strategic importance of Kashmir, a source of all major rivers, for Pakistan and symbolic importance of Kashmir for India are maximum list positions. Both the countries have fought two major wars in 1948, 1965 and a limited war in Kargil specifically on the Kashmir dispute. Among other issues, the newly born states fell into water sharing dispute right after their partition. Initially under an agreed formula, Pakistan paid for the river waters to India, which is an upper riparian state. After a decade long negotiations, both the states signed Indus Water Treaty in 1960. Under the treaty, India was given an exclusive right of three eastern rivers Sutlej, Bias and Ravi while Pakistan was given the right of three Western Rivers, Indus, Chenab and Jhelum. The tributaries of these rivers are also considered their part under the treaty. It was assumed that the treaty had permanently resolved the water issue, which proved a nightmare in the latter course. India by exploiting the provisions of IWT started wanton construction of dams on Pakistani rivers thus scaling down the water availability to Pakistan (a lower riparian state). The treaty only allows run of the river hydropower projects and does not permit to construct such water reservoirs on Pakistani rivers, which may affect the water flow to the low lying areas. According to the statistics of Hydel power Development Corporation of Indian Occupied Kashmir, India has a plan to construct 310 small, medium and large dams in the territory. India has already started work on 62 dams in the first phase. The cumulative dead and live storage of these dams will be so great that India can easily manipulate the water of Pakistani rivers. India has set up a department called the Chenab Valley Power Projects to construct power plants on the Chenab River in occupied Kashmir. India is also constructing three major hydro-power projects on Indus River which include Nimoo Bazgo power project, Dumkhar project and Chutak project. On the other hand, it has started Kishan Ganga hydropower project by diverting the waters of Neelum River, a tributary of the Jhelum, in sheer violation of the IWT. The gratuitous construction of dams by India has created serious water shortages in Pakistan. The construction of Kishan Ganga dam will turn the Neelum valley, which is located in Azad Kashmir into a barren land. The water shortage will not only affect the cultivation but it has serious social, political and economic ramifications for Pakistan. The farmer associations have already started protests in Southern Punjab and Sindh against the non-availability of water. These protests are so far limited and under control. The reports of international organizations suggest that the water availability in Pakistan will reduce further in the coming years. If the situation remains unchanged, the violent mobs of villagers across the country will be a major law and order challenge for the government. The water shortage has also created mistrust among the federative units, which is evident from the fact that the President and the Prime Minister had to intervene for convincing Sindh and Punjab provinces on water sharing formula. The Indus River System Authority (IRSA) is responsible for distribution of water among the provinces but in the current situation it has also lost its credibility. The provinces often accuse each other of water theft. In the given circumstances, Pakistan desperately wants to talk on water issue with India. The meetings between Indus Water Commissioners of Pakistan and India have so far yielded no tangible results. The recent meeting in Lahore has also ended without concrete results. India is continuously using delaying tactics to under pressure Pakistan. The Indus Water Commissioners are supposed to resolve the issues bilaterally through talks. The success of their meetings can be measured from the fact that Pakistan has to knock at international court of arbitration for the settlement of Kishan Ganga hydropower project. The recently held foreign minister level talks between both the countries ended inconclusively in Islamabad, which only resulted in heightening the mistrust and suspicions. The water stress in Pakistan is increasing day by day. The construction of dams will not only cause damage to the agriculture sector but India can manipulate the river water to create inundations in Pakistan. The rivers in Pakistan are also vital for defense during wartime. The control over the water will provide an edge to India during war with Pakistan. The failure of diplomacy, manipulation of IWT provisions by India and growing water scarcity in Pakistan and its social, political and economic repercussions for the country can lead both the countries toward a war. The existent A-symmetry between the conventional forces of both the countries will compel the weaker side to use nuclear weapons to prevent the opponent from taking any advantage of the situation. Pakistan's nuclear programme is aimed at to create minimum credible deterrence. India has a declared nuclear doctrine which intends to retaliate massively in case of first strike by its' enemy. In 2003, India expanded the operational parameters for its nuclear doctrine. Under the new parameters, it will not only use nuclear weapons against a nuclear strike but will also use nuclear weapons against a nuclear strike on Indian forces anywhere. Pakistan has a draft nuclear doctrine, which consists on the statements of high ups. Describing the nuclear thresh-hold in January 2002, General Khalid Kidwai, the head of Pakistan's Strategic Plans Division, in an interview to Landau Network, said that Pakistan will use nuclear weapons in case India occupies large parts of its territory, economic strangling by India, political disruption and if India destroys Pakistan's forces. The analysis of the ambitious nuclear doctrines of both the countries clearly points out that any military confrontation in the region can result in a nuclear catastrophe. The rivers flowing from Kashmir are Pakistan's lifeline, which are essential for the livelihood of 170 million people of the country and the cohesion of federative units. The failure of dialogue will leave no option but to achieve the ends through military means.

#### Water scarcity causes Central Asian war

Nitish Priyadarshi 12, lecturer in the department of environment and water management at Ranchi University in India, “War for water is not a far cry”, June 16, <http://www.cleangangaportal.org/node/44>

That's been a constant dilemma for the Central Asian states since they became independent after the Soviet break-up.

Much of Central Asia's water flows from the mountains of Kyrgyzstan and Tajikistan, leaving downstream countries Uzbekistan, Kazakhstan, and Turkmenistan dependent and worried about the effects of planned hydropower plants upstream.

Tashkent fears that those two countries' use of water from Central Asia's two great rivers -- the Syr Darya and Amu Darya -- to generate power will diminish the amount reaching Uzbekistan, whose 28 million inhabitants to make up Central Asia's largest population.

After the collapse of communism in the 1990s, a dispute arose between Hungary and Slovakia over a project to dam the Danube River. It was the first of its type heard by the International Court of Justice and highlighted the difficulty for the Court to resolve such issues decisively. There are 17 European countries directly reliant on water from the Danube so there is clear potential for conflict if any of these countries act selfishly.

Experts worry that dwindling water supplies could likely result in regional conflicts in the future. For example, in oil-and-gas rich Central Asia, the upstream countries of Kyrgyzstan and Tajikistan hold 90 percent of the region's water resources, while Uzbekistan, the largest consumer of water in the region, is located downstream.

#### Extinction

**Blank 2k** [Stephen J. - Expert on the Soviet Bloc for the Strategic Studies Institute, “American Grand Strategy and the Transcaspian Region”, World Affairs. 9-22]

Thus many structural conditions for conventional war or protracted ethnic conflict where third parties intervene now exist in the Transcaucasus and Central Asia. The outbreak of violence by disaffected Islamic elements, the drug trade, the Chechen wars, and the unresolved ethnopolitical conflicts that dot the region, not to mention the undemocratic and unbalanced distribution of income across corrupt governments, provide plenty of tinder for future fires. Many Third World conflicts generated by local structural factors also have great potential for unintended escalation. Big powers often feel obliged to rescue their proxies and proteges. One or another big power may fail to grasp the stakes for the other side since interests here are not as clear as in Europe. Hence commitments involving the use of nuclear weapons or perhaps even conventional war to prevent defeat of a client are not well established or clear as in Europe. For instance, in 1993 Turkish noises about intervening on behalf of Azerbaijan induced Russian leaders to threaten a nuclear war in that case. Precisely because Turkey is a NATO ally but probably could not prevail in a long war against Russia, or if it could, would conceivably trigger a potential nuclear blow (not a small possibility given the erratic nature of Russia's declared nuclear strategies), the danger of major war is higher here than almost everywhere else in the CIS or the "arc of crisis" from the Balkans to China. As Richard Betts has observed, The greatest danger lies in areas where (1) the potential for serious instability is high; (2) both superpowers perceive vital interests; (3) neither recognizes that the other's perceived interest or commitment is as great as its own; (4) both have the capability to inject conventional forces; and (5) neither has willing proxies capable of settling the situation.(77)

#### Only SMR’s solve

IAEA 7, “Economics of Nuclear Desalination: New Developments and Site Specific Studies”, July, <http://www-pub.iaea.org/MTCD/publications/PDF/te_1561_web.pdf>

Seventy percent of the planet is covered with water, but only 2.5% of that is fresh water. Nearly 70% of this fresh water is frozen in the icecaps of Antarctica and Greenland. Most of the rest is in the form of soil moisture or in deep inaccessible aquifers or comes in the form of heavy rains and floods that are difficult to contain and exploit. Consequently, only less than 0.008% (about 70 000 km3) of the world’s water is readily accessible for direct human use, and even that is very unevenly distributed. Recent statistics show that currently 2.3 billion people live in water-stressed areas and among them 1.7 billion live in water-scarce areas, where the water availability per person is less than 1000 m3/year. In fact, the situation is expected to worsen further since, by 2025, the number of people suffering from water stress or scarcity could swell to 3.5 billion, out of which 2.4 billion would live in water-scarce regions. Water scarcity is a global issue. Every year new countries are affected by growing water problems.

It is for this reason that the Millennium Declaration by UN General Assembly in 2000 set up a target

to halve, by the year 2015, the world population, which is unable to reach, or to afford, safe drinking

water. Vision 21: shared vision for Hygiene, Water Supply and Sanitation, has a target to provide

water, sanitation and hygiene for all by 2025.

Better water conservation, water management, pollution control and water reclamation are all part of the integrated solution to projected water stresses. So too are new sources of fresh water, including the desalination of seawater.

Desalination technologies have been well established since the mid-20th century and widely deployed in the Middle East and North Africa. The contracted capacity of desalination plants has increased steadily since 1965 and is now about 36 million m3/day worldwide, as shown in Figure 1. This capacity could cater to world’s population roughly 6 litres a day per capita of fresh potable water. If this capacity were available to 1.5 billion in the world without direct access to drinking water, it would provide approximately 20 litres/day/capita.

Large scale commercially available desalination processes can generally be classified into two categories: (a) distillation processes that require mainly heat plus some electricity for ancillary equipment, and (b) membrane processes that require only electricity. In the first category (distillation) there are two major processes: multi-stage flash (MSF) and multi-effect distillation (MED). In both processes, seawater is heated; the steam that evaporates is condensed and collected as freshwater; and the residual brine is discharged.

In the second category (membranes) is the reverse osmosis process (RO), in which pure water passes from the high-pressure seawater side of a semi-permeable membrane to the low-pressure freshwater side. The pressure differential must be high enough to overcome the natural tendency for water to move from the low concentration freshwater side of a membrane to the high concentration seawater side in order to balance osmotic pressures.

The energy for the desalination plants is generally supplied in the form of either steam or electricity. Conventional fossil fuel-powered plants have normally been utilized as the primary sources but their intensive use raises increasing environmental concerns, specifically in relation to greenhouse gas emissions (Section 1.3.3). The depleting sources and the future price uncertainty of the fossil fuels and their better use for other vital industrial applications are also the factors to be considered.

1.3. THE ROLE OF NUCLEAR POWER IN DESALINATION

The world energy requirements are presently met from oil, coal, gas, hydro, nuclear and renewable energies in that order as shown in Table 1.

It is now universally recognized that there will be an increase in the world’s requirement for electricity over the next few decades. The present trend towards meeting this demand includes the building of fossil fuel plants, particularly combined cycle gas fired plants.

However, the spiralling increase in greenhouse gas (GHG) emissions has resulted in setting the emission targets in international meetings held at Toronto, Rio de Janeiro and Kyoto. The IAEA predicts that the GHG emissions would be 36-50% higher by 2010 compared to 1990 levels. Many analysts, therefore, feel that the only viable alternative to fossil fuels is nuclear energy to reduce the rate of increase of GHG, particularly, carbon dioxide.

Yet another incentive for nuclear power is to maintain diversity of supply. A national strategy limited to one particular form of energy (fossil fuels) will be vulnerable to increased fuel costs and pressures from exporting countries.

Nuclear power is a proven technology, which has provided more than 16% of world electricity supply in over 30 countries. More than ten thousand reactor-years of operating experience have been accumulated over the past 5 decades.

There are many reasons which favour a possible revival of the nuclear power production in the years to come. It is thus expected that this revival would also lead to an increased role of nuclear energy in non-electrical energy services, which, at the moment, are almost entirely dominated by fossil energy sources. Among various utilization of nuclear energy for non-electrical products, using it for the production of freshwater from seawater (nuclear desalination) has been drawing broad interest in the IAEA Member States as a result of acute water shortage issues in many arid and semi-arid zones worldwide. With technical co-ordination or support of the IAEA, several demonstration programs of nuclear desalination are also in progress in several Member States to confirm its technical and economical viability under country-specific conditions

The desalination of seawater using nuclear energy is a feasible option to meet the growing demand for potable water. Over 175 reactor-years of operating experience on nuclear desalination have already been accumulated worldwide.

1.3.1. Nuclear desalination

In the IAEA terminology, nuclear desalination is defined to be the production of potable water from seawater in a facility in which a nuclear reactor is used as the source of energy for the desalination process. Electrical and/or thermal energy may be used in the desalination process on the same site. The facility may be dedicated solely to the production of potable water, or may be used for the generation of electricity and production of potable water, in which case only a portion of the total energy output of the reactor is used for water production.

The design approaches for a nuclear desalination plant are essentially derived from those of the nuclear reactor alone, with some additional aspects to be considered in the design of a desalination plant and its integration with the nuclear system.

All nuclear reactor types can provide the energy required by the various desalination processes. In this regard, it has been shown that Small and Medium Reactors (SMRs) offer the largest potential as coupling options to nuclear desalination systems in developing countries. The development of innovative reactor concepts and fuel cycles with enhanced safety features as well as their attractive economics are expected to improve the public acceptance and further the prospects of nuclear desalination.

The coupling with nuclear system is not difficult technically but needs some consideration in (a)

avoiding cross-contamination by radioactivity, (b) providing backup heat or power sources in case the

nuclear system is not in operation (e.g. for refuelling and maintenance), (c) incorporation of certain

design features, minimising the impact of the thermal desalination systems’ coupling to the nuclear

reactors (Section 1.6).

1.3.2. Why nuclear desalination?

The International Atomic Energy Agency is a specialized organization of the UN system that seeks to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. The institutional basis for the IAEA’s involvement in nuclear desalination is in its Statute and Medium Term Strategy.

Article II of the IAEA Statute provides that:

“ The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world”.

This refers implicitly to nuclear desalination as an option for the use of nuclear technologies.

The same applies to the Article III of the Statute, which authorizes the IAEA:

“ To encourage and assist research on, and development and practical application of, atomic energy for peaceful uses throughout the world….”; (Article III, A.1); and

“To foster the exchange of scientific and technical information on peaceful uses of atomic energy.” (Article III, A.3).

In addition, Objective A.3 of the Agency’s Medium Term Strategy requires the Agency:

“ To support and facilitate the development of new and emerging applications of nuclear technologies by co-generation and heat applications, including seawater desalination”.

Request of assessing feasibility of using nuclear energy for seawater desalination was first made by the five North African countries to the IAEA in 1989 and the General Conference adopted its resolution to resume the study. These countries are located in semi-arid zones and already suffer from water shortages.

In recent years, interests have been also been indicated by Member States in South and South East Asia for the feasibility, as well as the demonstration, of nuclear desalination projects. The issue has since then been repeatedly stressed at the General Conference (Committee on the Whole) and supported by many Member States including most members of Group-77. The support stems not only from their expectation of its possible contribution to the freshwater issue but has also been motivated by a variety of reasons that include: the economic competitiveness of nuclear desalination in areas lacking cheap hydropower or fossil fuel resources, energy supply diversification, conservation of fossil fuel resources and spin-off effects of nuclear technology for industrial development.

Looking to the future, there are several reasons for focusing now on expanding nuclear power’s contribution to desalination. Apart from the expanding demand for freshwater and the increasing concern about GHG emissions and pollution from fossil fuels, there is a renewed and growing emphasis on small and medium sized nuclear reactors, and this is particularly important for desalination because the countries most in need of new sources of freshwater often have limited industrial infrastructures and relatively weaker electricity grids. The size of the grid limits the possibilities for integrating a co-generating nuclear power plant into the grid to supply the electricity market, in addition to meeting the energy requirements of a desalination plant. The largest power unit that can be integrated into an electricity grid must not exceed about 10-20 % of the total grid capacity. Of course, smaller nuclear reactors would be more appropriate for remote areas that are not suitable for connections to the grid.

For nuclear desalination to be attractive in any given country, two conditions have to be satisfied simultaneously: a lack of water and the ability to use nuclear energy for desalination. In most regions, only one of the two is present. Both are present for example in China, the Republic of Korea, India and Pakistan. These regions already account for almost half the world’s population, and thus represent a potential long term market for nuclear desalination. The market will expand further to the extent that regions with high projected water needs, such as the Middle East and North Africa, increase their nuclear expertise and capabilities.

1.3.3. Environmental impact of desalination by fossil fuelled energy sources

Desalination is an energy intensive process. A future desalination strategy based only on the use of fossil fuelled systems is not sustainable: Fossil fuel reserves are finite and must be conserved for more important uses such as transport, petrochemical industry etc. Besides, the demands for desalted water would continue increasing as population grows and standards of living improve. Conservation measures such as the modernisation of water networks to minimise leakages, the recycling of used water etc. will certainly reduce the future water demands slightly but they would not be able to halt the dissemination of desalination plants and consequently of the fossil fuelled based systems for the production of needed electricity and heat.

The following paragraphs illustrate the damaging consequences of such a policy by taking the example of the Mediterranean region.

Following the recent “Blue Plan” [2], the total available natural water resources (1), based on the statistics from 1990 to 1998, in the principle countries of the Mediterranean region, are as shown in Table 2.

The projected demands (3) for the year 2025 [31] are also included in Table 1.

It is obvious that available natural water resources would rather decrease in 2025 because of increased pollution, over exploitation and other human activities. However, to keep matters simple, it would be supposed that they would remain at the same level as in 1998.

It can be observed that, in 2025, the total projected water deficit (balance) in the Mediterranean region would of the order of 294 km3/per year.

Not all this required capacity would be met by desalination plants. Current contribution of desalination is of the order of 1 to 2 %. If it is supposed that in 2025, this contribution would be about 2.5 %, then the total required desalting capacity would be 7.3 km3/year (20.1 million m3/day).

According to the EC ExternE study2, the total emissions of GHG per MW(e).h of electricity produced by representative fossil fuelled power plants in France, are as presented in Table 3.

The specific heat and electricity consumptions of three main desalination plants are given in Table 4, [3].

The data presented in the above Tables allows to calculate the approximate3 total GHG emissions produced by the fossil fuelled plants and the three desalination plants.

Results for a total desalting capacity of 20.1 million m3/day are presented in Table 5.

It can thus be concluded that for a desalting capacity of 20.1 million m3/day in the Mediterranean region alone, required in 2025, one would produce, depending upon the energy source and the desalination process used,

13 to 264 million tonnes/year of CO2.

1350 to 1 310 000 tonnes/year of SOx.

21 100 to 540 000 tonnes/year of NOx.

1190 to 40 000 tonnes/year of particles.

The potential levels of GHG and particle emissions on the world scale could then be more than double these figures.

These could naturally be avoided through the use of nuclear energy.

#### Key to deescalate conflicts

Palley ‘11

Reese Palley, The London School of Economics, 2011, The Answer: Why Only Inherently Safe, Mini Nuclear Power Plans Can Save Our World, p. 168-71

The third world has long been rent in recent droughts, by the search for water. In subsistence economies, on marginal land, water is not a convenience but a matter of life and death. As a result small **wars have been fought, rivers diverted, and wells poisoned in what could be a warning of what is to come as industrialized nations begin to face failing water supplies.** Quite aside from the demand for potable water is the dependence of enormous swaths of industry and agriculture on oceans of water used for processing, enabling, and cleaning a thousand processes and products. It is interesting to note that fresh water used in both industry and agriculture is reduced to a nonrenewable resource as agriculture adds salt and industry adds a chemical brew unsuitable for consumption. More than one billion people in the world already lack access to clean water, and things are getting worse. Over the next two decades, the average supply of water per person will drop by a third, **condemning millions** of people **to** waterborne **diseases** and an avoidable premature death.81 So **the stage is set for water access wars between** the **first and the third worlds**, between **neighbors** downstream of supply, between **big industry** and big agriculture, between **nations**, between **population** centers, and ultimately between you and the people who live next door for an already inadequate world water supply that is not being renewed. **As populations inevitably increase, conflicts will intensify**.82 It is only by virtue of the historical accident of the availability of nuclear energy that humankind now has the ability to remove the salt and other pollutants to supply all our water needs. The problem is that **desalination is an intensely local process**. Some localities have available sufficient water from renewable sources to take care of their own needs, but not enough to share with their neighbors, and it **is here that the scale of nuclear energy production must be defined locally.** Large scale 1,000 MWe plants can be used to desalinate water as well as for generating electricity However we cannot build them fast enough to address the problem, and, if built they would face the extremely expensive problem of distributing the water they produce. Better, much better, would be to use small desalinization plants sited locally. Beyond desalination for human use is the need to green some of the increasing desertification of vast areas such as the Sahara. Placing twenty 100 MWe plants a hundred miles apart along the Saharan coast would green the coastal area from the Atlantic Ocean to the Red Sea, a task accomplished more cheaply and quickly than through the use of gigawatt plants.83 This could proceed on multiple tracks wherever deserts are available to be reclaimed. Leonard Orenstein, a researcher in the field of desert reclamation, speculates: If most of the Sahara and Australian outback were planted with fast-growing trees like eucalyptus, the forests could draw down about 8 billion tons of carbon a year—nearly as much as people emit from burning fossil fuels today. As the forests matured, they could continue taking up this much carbon for decades.84 **The use of small, easily transported**, easily **sited**, and walk away **safe nuclear reactors dedicated to desalination is the only answer** to the disproportionate distribution of water resources that have distorted human habitation patterns for millennia. Where there existed natural water, such as from rivers, great cities arose and civilizations flourished. Other localities lay barren through the ages. We now have the power, by means of SMRs profiled to local conditions, not only to attend to existing water shortages but also to smooth out disproportionate water distribution and create green habitation where historically it has never existed. **The endless wars that have been fought**, first over solid bullion gold and then over oily black gold, **can now engulf us in the desperate reach for liquid blue gold. We need never fight these wars again as we now have the nuclear power to fulfill the** biblical **ability to “strike any local rock and have water gush forth**.”

#### It’s economically viable

Gamini Seneviratne 7, Nuclear News’s Vienna Correspondent, “Research projects show nuclear

desalination economical”, April, <http://www.ans.org/pubs/magazines/nn/docs/2007-4-3.pdf>

The desalination of seawater using nuclear power is cost-effective compared with other primary energies, according to researchers in 10 countries who have studied various options at specific sites in their own countries. Their findings show nuclear to be at least competitive in all cases.

Researchers from Argentina, China, Egypt, France, India, Korea, Pakistan, Russia, Syria, and the United States focused on the economics of producing potable water by using various desalination technologies and energy sources at particular sites. The participants followed an agreed procedure throughout a coordinated research project (CRP), Economics of Nuclear Desalination— New Developments and Site-specific Studies, set up by the International Atomic Energy Agency. The findings of the studies, carried out over three years and ending in November 2006, are included in a technical document (IAEA-TECDOC) already at the printer.

“There is a dire shortage of fresh water for drinking in many countries already, and when you realize that 70 percent of the planet is covered with water but only 2.5 percent of that is fresh water, it is hardly surprising,” Ibrahim Khamis, who heads the IAEA’s desalination unit, told Nuclear News. He added that 70 percent of that fresh water is frozen in the polar icecaps and Greenland, and most of the rest is in soil moisture, inaccessible underground aquifers, or comes as heavy rain that is difficult to capture. “So only some 0.008 percent, about 70 000 km3, is readily available, and even that is very unevenly distributed.”

According to Khamis, recent statistics show 2.3 billion people living in water stressed areas, 1.7 billion of them in areas where the availability is on average less than 1000 m3 a year. Given human population growth and the increasing demands of industry and agriculture, the projections point to a continuously worsening situation, even if the effects of global warming are not taken into account. Khamis said he foresaw a time when nuclear power will be sought for desalination rather than for electricity generation, at least in some specific regions of the world such as the Middle East. “You can live without electricity for quite a long time; without water, only a matter of days.” The U.S. study, which was undertaken by Argonne National Laboratory (ANL), notes that “the need for fresh water, high-purity water, and other grades of water for various domestic, industrial, and agricultural applications is ever increasing in the United States.” Demand is driven mainly by population, as well as continuous economic and technological growth, and it is predicted that more than an additional 60 billion m3 of water a year will be needed for municipal and light industrial uses by the year 2020. An additional 11–19 liters per day per person will be needed to generate hydrogen, should transportation be based mainly on hydrogen-powered vehicles in the future. “Cogeneration of water and power could offer a major portion of the additional water needed, in addition to providing much needed energy for maintaining sustainable development and growth,” the ANL report says.

The IAEA report says that desalinating seawater is not the only solution under discussion for remedying the water scarcity, but it is an important one. There are essentially two methods: distillation using heat, and the use of membranes and electricity directly. The two main distillation modes, known as multistage flash (MSF) and multieffect distillation (MED), both involve heating seawater to produce steam, followed by evaporation, condensation, and, finally, pure water collection. The method using membranes, which is called reverse osmosis (RO), uses electricity to create a pressure differential across a semipermeable membrane, allowing fresh water to pass through to the low-pressure side, and leaving salty seawater on the high-pressure side.

Desalination plant capacity worldwide is close to 40 million m3 today, mostly by distillation using fossil energy, and mostly in the Middle East and North Africa. Nuclear desalination has so far been exclusively for use within the nuclear power plants themselves, except at the Soviet-built BN-350 fast reactor in Aktau, Kazakhstan, which supplied potable water to local communities until it was shut down in 1999.

Currently, only India supplies nuclear desalinated water outside the plant site. Having earlier used MSF to get plant-use water, it has also integrated RO to the desalination unit at its Kalpakkam pressurized heavy-water reactor (PHWR) in Chenai, and it has begun (experimentally) supplying some water outside the power station. Pakistan has begun a similar project at its Karachi nuclear power plant (KANUPP) to couple a 1600 m3/day MED unit to the nuclear plant, which earlier operated a 454 m3/day RO facility for plant use.

Fresh water is needed for many purposes. Saudi Arabia alone already irrigates crops with desalinated water. A number of countries, notably Egypt, the Persian Gulf States, Israel, Jordan, and Libya, depend on the technology to maintain tourism. Khamis said nuclear desalination has been held back by two key factors: economics, and the unavailability of reactors of appropriate size.

The CRP addressed the former, comparing cost performance between reactor plus desalination method combinations. The perception that nuclear is less cost-effective than other energy sources was repudiated by the studies.

The report says that the country case studies “have shown that in general, the nuclear desalination costs can vary from $0.5 to $0.94/m3 for RO, from $0.6 to $0.96/m3 for MED, and from $1.18 to $1.48/m3 for MSF plants. All nuclear options are economically attractive as compared with the gas turbine combined-cycle–based desalination systems, as long as gas prices remain higher than $150/toe [metric tons oil equivalent] or $21/bbl [barrel].”

#### Plan accesses a huge export market

Rosner and Goldberg 11

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

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

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

## solvency

#### 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**.

#### Alternative financing arrangements reduce costs and spur unique commercial spillover

Fitzpatrick, Freed and Eyoan, 11

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

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

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

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

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

#### DoD installations are key – market pull

Jeffrey **Marqusee 12**, Executive Director of the Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP) at the Department of Defense, “Military Installations and Energy Technology Innovation”, March, <http://bipartisanpolicy.org/sites/default/files/Energy%20Innovation%20at%20DoD.pdf>

The key reason that DoD cannot passively rely on the private sector to provide a suite of new, cost-effective energy technologies is the difficulty of the transition from research and development to full deployment. Many have noted this challenge; it is often described as the “Valley of Death,” a term widely used in the early and mid-1990s to describe the obstacles to commercialization and deployment of environmental technologies. DoD’s environmental technology demonstration program, the Environmental Security Technology Certification Program (ESTCP), was created to overcome that hurdle. Why can’t DoD rely on the Department of Energy (DOE) to solve the commercialization and deployment problem? DOE has a mixed record in this area. Reasons for past failures at DOE are: 1) the lack of a market within DOE for the technologies; 2) overly optimistic engineering estimates; 3) lack of attention to potential economic or market failures; 4) a disconnect between business practices at DOE and commercial practices, which leads to demonstration results that are not credible in the private sector; and 5) programs completely driven by a technology “push,” rather than a mix of technology push and market-driven pull.81 Many of these issues can be viewed as arising from the first: the lack of a market within DOE. Since DOE is neither the ultimate supplier nor buyer of these technologies at the deployment scale, it is not surprising that there are challenges in creating a system that can bring technologies across the Valley of Death. DoD’s market size allows it to play a critical role in overcoming this challenge for the energy technologies the department’s installations require, as it has for environmental technologies. In addressing the barriers energy technologies face, and understanding the role DoD installations can play, it is important to understand the type and character of technologies that DoD installations need. Energy technologies span a wide spectrum in costs, complexities, size, and market forces. Installation energy technologies are just a subset of the field, but one that is critical in meeting the nation’s and DoD’s energy challenges. DOE, in its recent strategic plans and quadrennial technology review, has laid out the following taxonomy (figure 3.5): It is useful to divide these energy technologies into two rough classes based on the nature of the market and the characteristics of deployment decisions. There are technologies whose capital costs at full scale are very high, for which a modest number of players will play a key role in implementation decisions. Examples include utility-scale energy generation, large-scale carbon sequestration, commercial production of alternative fuels, nextgeneration utility-grid-level technologies, and manufacturing of new transportation platforms. Some of these technologies produce products (e.g., fuel and power from the local utility) that DoD installations buy as commodities, but DoD does not expect to buy the underlying technology. A second but no less important class of energy technologies are those that will be widely distributed upon implementation, and the decisions to deploy them at scale will be made by thousands, if not millions, of decision makers. These include: 1) Technologies to support improved energy efficiency and conservation in buildings; 2) Local renewable or distributed energy generation; and 3) Local energy control and management technologies. Decisions on implementing these technologies will be made in a distributed sense and involve tens of thousands of individual decision makers if they are ever to reach large-scale deployment. These are the energy technologies that DoD installations will be buying, either directly through appropriated funds or in partnership with third-party financing through mechanisms such as Energy Saving Performance Contracts (ESPCs) or Power Purchase Agreements (PPAs). In the DOE taxonomy shown above, these distributed installation energy technologies cover the demand space on building and industrial efficiency, portions of the supply space for clean electricity when restricted to distributed generation scale, and a critical portion in the middle where microgrids and their relationship to energy storage and electric vehicles reside.

#### And expertise

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.

## link uq

#### DoE just massively increased SMR incentives, but it fails

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.

#### 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.

# 2AC

## dod

US is specifically pursuing peaceful uses of space now—creates international consensus for a space code of conduct.

Huntley ‘11

(Wade, senior lecturer in the National Security Affairs department at the Naval Postgraduate School in Monterey, California, “The 2011 U.S. National Space Security Policy: Engagement as a Work in Progress”, Disarmament Times, Spring, http://disarm.igc.org/index.php?option=com\_content&view=article&id=429:the-2011-us-national-space-security-policy-engagement-as-a-work-in-progress&catid=154:disarmament-times-spring-2011&Itemid=2)

As is well understood, the space policies of the Bush administration were decidedly oriented toward military security concerns and independent action. The 2006 National Space Policy unabashedly proclaimed the U.S. intention to maintain a dominant position in space indefinitely. This policy orientation dismissed multilateral cooperation as impinging on U.S. “freedom of action,” throwing weight instead behind a wide range of technology development initiatives founded on the assumption that deployment of weapons in space was, if not already factual, certainly inevitable.2 U.S. commercial and civil engagement was overshadowed by these security concerns, expressed through the tightening of export control restrictions inhibiting a broad range of technology sharing. Once again, U.S. space policy was subsumed by other national priorities, in this case dominated by military security concerns. This background is essential for appreciating how the space policies of the Obama administration are beginning **to genuinely break new trails.** The U.S. National Space Policy issued in June 2010 has been **widely recognized** for its cooperative and multilateral tone, including as explicit near-term goals the expansion of international cooperation on all activities and pursuing international as well as national measures to enhance space stability. Particularly notable are the document’s emphasis on orienting U.S. “leadership” toward fostering international cooperation, and its references, in its concluding section, to cooperation with other states and non-state actors in the pursuit of national security space objectives.3 Less broadly noticed was this policy’s clarity and coherence in articulating a vision for U.S. space activities on its own terms. The document is organized around core principles, subsidiary goals and implementing guidelines that exceed its predecessors in delineating a longer-term direction for U.S. space policy that is integrated with, rather than derivative of, broader U.S. global aims.4 The policy also was generated and issued far earlier in the tenure of the administration than either of its predecessors, indicating an increased prioritization of attention to space policy at higher levels of policy-making. To some degree, a turn toward multilateral cooperation in U.S. space policy was to be expected. China’s 2007 anti-satellite weapon (ASAT) test and the 2009 Iridium-Cosmos collision increased awareness of the challenge of space debris and the need for better global information sharing on space situational awareness (SSA).5 Also, new budget realities and unpromising technological developments have scaled back ambitions in some quarters for solving U.S. space security concerns with new independent capabilities. Finally, the Obama administration has pursued a more cooperative disposition across a wide range of global policy challenges, from Iranian nuclear ambitions to global climate change. But the improved clarity of vision in the 2010 Space Policy suggests that the emphasis on fostering global cooperation on space-related activities is more grounded in deliberate foresight than sailing the prevailing political winds. The 2011 National Security Space Strategy, released February 4, is best interpreted against this background of the Obama administration’s turn toward both greater international space cooperation and greater attention to space policy in general. This first-of-its-kind strategic statement culminates a congressionally mandated space posture review.6 The initial section portraying the strategic environment to which U.S. security policy must be responsive highlights the growing problems of space debris, orbital congestion and coordination among a growing number of space actors — not state-based security threats per se. The Security Space Strategy features the objective of a “stable space environment in which nations exercise shared responsibility.”7 Specific provisions intended to implement this strategy, relevant to the preceding observations, include:8 • The strategy presents a full section on “Partnering with Responsible Nations, International Organizations, and Commercial Firms.” This category is not wholly multilateral in the traditional sense, displaying a symbiosis of alliance-building and collective cooperation not always carefully distinguished; i.e., “The United States will lead in building coalitions of like-minded space-faring nations and, where appropriate, work with international institutions to do so.” • The strategy intends to “encourage responsible behavior in space and lead by the power of example,” a significant observation given the tendency of U.S. policy-makers (as noted above) not to expect quid pro quo responses to cooperative gestures. Also, the strategy states the U.S. “will support development of data standards, best practices, **t**ransparency and **c**onfidence-**b**uilding **m**easure**s**, and *norms of behavior for responsible space operations*.” [italics added] In the context of the section on “Preventing and Deterring Aggression,” the strategy similarly intends to “support diplomatic efforts to promote norms of responsible behavior in space” as well as “pursue international partnerships that encourage potential adversary restraint,” along with other measures. **This emphasis on norm-building and the role of example suggests a near-term endorsement of the development of “codes of conduct” for space activities** (such as the recently revised European Union Code of Conduct, discussed below), whether or not such concord leads to more formal arms control arrangements in the longer-term. • The Department of Defense is directed to “foster cooperative SSA relationships,” and to “expand provision of safety of flight services to U.S. Government agencies, other nations, and commercial firms.” Greater SSA information sharing has been a key suggestion for fostering international cooperation; the U.S. possesses globally superior SSA capabilities, but restricts the sharing of this information on the basis of national security concerns.9 Hence, this nominal commitment is significant in its own right. • The strategy commits to reforming export controls. “In particular, as new opportunities arise for international collaboration, a revised export control system will better enable the domestic firms competing for these contracts.” As noted above, the oppressive impact of current U.S. export controls not only impinges on U.S. commercial space actors but also epitomizes the high degree to which U.S. policy has subsumed commercial and civil interests to national security concerns. The strategy appears to acknowledge this connection and commit to remedy it. • The most assertive passages of the statement are moderated with community-building intent. For example, the strategy’s section on “Preventing and Deterring Aggression” concludes that the U.S. “will retain the right and capabilities to respond in self-defense, should deterrence fail,” but immediately adds that the U.S. “will use force in a manner that is consistent with longstanding principles of international law, treaties to which the United States is a party, and the inherent right of self defense.” • The concluding and most conflict-oriented section of the strategy opens by noting that “some actors may still believe counterspace actions could provide military advantage.” Counterspace capabilities, unarticulated in the document, include ASATs, ground-based directed energy weapons and satellite transmission jamming. Deputy Assistant Secretary of Defense for Space Policy Gregory Schulte explained at the strategy’s rollout that China is a principal concern in this regard, but so is the proliferation of these technologies: “If Ethiopia can jam a commercial satellite, you have to worry what others can do.”10 This section of the strategy does not, however, call for maintaining options to develop complementary space conflict capabilities. Rather, the strategy asserts that the U.S. “must be prepared to ‘fight through’ a degraded environment,” and identifies “resilience” and “space protection” as the key criteria. The preceding survey of elements of the 2011 National Security Space Strategy is deliberately selective, highlighting those elements expressing consistency with the 2010 National Space Policy’s bend toward fostering greater international collaboration. Perhaps as striking as the prevalence of such passages, however, is the absence of expressed intention — even couched in hedging language — to sustain or expand the kind of independent space-based military capabilities that were the centerpiece of the prior administration’s aims (if not its accomplishments). Again, to some extent this turn in tone is overdetermined by extenuating global circumstances. But one must still be struck by the degree to which developments such as the Chinese ASAT test have not ignited the kind of response one might have anticipated only a few short years after Donald Rumsfeld’s notorious warning of a “space Pearl Harbor.”11 The most immediate significance of the National Security Space Strategy is likely the signals its sends concerning U.S. policy toward the recently revised European Union Code of Conduct.12 The strategy did not explicitly endorse this EU initiative, but Mr. Schulte, at the February 4 presentation of the strategy, highlighted the initiative “as a potential way” to promote “transparency and confidence-building measures, which tend to be voluntary as opposed to legally binding.” A week earlier, Rose Gottemoeller, Assistant Secretary of State for Arms Control, Verification and Compliance, stated at the Conference on Disarmament that the administration was nearing a decision on whether the U.S. would sign on to the code, and what modifications might be required in order to do so.13 As U.S. interest in the Code of Conduct has increased, debates over its provisions and its relationship to the Outer Space Treaty have intensified. These policy movements toward multilateral engagement and commitment to behavioral standards (even if non-binding) mark a sharp departure from the stiff resistance to curtailing U.S. “freedom of action” in the previous administration, and have accordingly generated resistance from congressional opponents on just those terms. Prior to the release of the National Security Space Strategy, a group of 37 Republican senators led by Arizona Senator Jon Kyl issued a letter to Secretary of State Hillary Rodham Clinton expressing concern over a potential multilateral commitment that might limit development and/or deployment of space-based missile defense interceptors and ASAT-defeating systems.14 Critics also decried the strategy’s emphasis on “the old fallacious assumption that the power of example will prevent adversaries from doing the United States harm,” and endorsed maintaining the goal of U.S. retention of a “dominant position in military and intelligence space capabilities.”15 In fact, the administration’s warming toward normative commitments in general — and the EU Code of Conduct in particular — are in part intended to forestall pressure for more formal and binding measures that would definitively cut off the “hedge” of unilateral U.S. weapons development options.16 The balance of U.S. debate may have shifted toward greater international cooperation, but the terms of the debate remain the same. In sum, the National Security Space Strategy appears to mark not only a swing in U.S. policy toward greater global engagement but also, and more importantly, a step toward greater long-term coherence in thinking concerning the core goals of U.S. space activities. Even supporters of the general directions of the strategy noted its more-than-expected breadth of thought.17 But if this reading is sound, the strategy is still but one step on a long road, and ongoing debates over the role of U.S. space policy vis-à-vis broader national security interests will insure that road is bumpy. Suggesting such limitations, Mr. Schulte acknowledged that the classified version of the strategy is only four pages longer than the released version, indicating that more specific guidelines for military implementation of the strategy remain to be developed.18 Many devils may lurk in these details.

#### No renewables investment

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

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

## commons

#### Rapid and effective military operations k2 command of the commons

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Over the last several years, examination of U.S. national security interests within the context of the global commons has emerged as a major policy issue in the defense community.1 At the highest levels of the Department of Defense (DOD), there is now an awareness that the U.S. military will be confronted by a host of challenges “to stability throughout the global commons.”2 Furthermore, the Nation can “expect to be increasingly challenged in securing and maintaining access to the global commons and must also be prepared for operations in unfamiliar conditions and environments.”3 In response, the 2010 Quadrennial Defense Review Report has now assigned “assured access” to the commons as a top priority for U.S. military forces.4 As defined by DOD, the global commons comprise the geographic and virtual realms of “space, international waters and airspace, and cyberspace.”5 They are a subset of the broader maritime, aerospace, and cyber domains, deriving their existence from the notion of areas that are accessible to all but owned by none. The commons are seen as the essential conduits of U.S. national power in a rapidly globalizing and increasingly interconnected world. The heritage of the commons’ strategic importance can be traced back at least as far as Alfred Thayer Mahan, who highlighted the relationship between maritime power and the ability to maintain the sea lines of communications with economic expansion and the impact on overall national power.6 Attainment of U.S. strategic, economic, informational, and military objectives is contingent upon assured access to, and freedom of action within, the commons. Accordingly, global commons access must remain at the forefront of U.S. national security imperatives. Successful application of military power in and through the global commons in support of overarching U.S. national objectives is likewise dependent upon the ability of military forces to access and maneuver within and across the commons—to deliver power in and through the various geographies. While the required extent and duration of the U.S. military’s access to and freedom of action in the commons will be determined by larger strategic factors, the fundamental ability to achieve them is becoming more problematic. New complexities in the global commons potentially lessen military effectiveness, diminishing the military’s ability to support national interests. Arguably, the least recognized and least understood of these complexities is the notion of domain interrelationships: the idea that intradomain military operations are increasingly dependent on interdomain dependencies.7 Barring a fundamental shift in U.S. strategic objectives, the military must retain the ability to operate throughout the global commons to achieve the requisite level of local control and superiority for mission success in support of national objectives. To accomplish this, the U.S. defense establishment must reassess the fundamental ideas and concepts regarding military power employment within the global commons in light of expanding domain interrelationships.

#### That’s key to trade – key to hegemony and growth

Tara Murphy 10, fellow with the defense and national security group at CSIS, “Security Challenges in the 21st Century Global Commons”, July 20, <http://yalejournal.org/2010/07/security-challenges-in-the-21st-century-global-commons/>

Since World War II, the United States has leveraged its political and economic leadership as well as its military strength to lead the way in developing an international system that fosters stability. Relatively unfettered access to the global commons has enabled the United States to move toward an open, globalized economy and closer partnerships with friends and allies. More precisely, the commons have provided for freedom of action for the U.S. military; access to physical infrastructure (such as military bases and logistics centers); availability of timely, highly accurate information and the ability to communicate it quickly; global economic interdependence; and the explosion of international travel. It is these elements, important to every nation around the world, that are increasingly threatened by a number of challenges emerging in the 21st century global commons. The DoD Capstone Concept for Joint Operations identifies perhaps the greatest challenge to U.S. operations in the global commons in the near future: Diminished access will complicate the maintenance of forward presence, a critical aspect of past and current U.S. military strategy, necessitating new approaches to responding quickly to developments around the world as well as more robust exploitation of existing U.S. advantages to operate at sea and in the air, space, and cyberspace.[xxii] The development and proliferation of anti-access/area-denial (A2/AD) technologies to an increasing number of states, including potential U.S. adversaries, presents U.S. leaders with what military strategist Andrew Krepinevich calls, “a strategic choice of the first magnitude.”[xxiii] Namely, U.S. leaders must decide to either change the way the United States does business or surrender the ability to project power worldwide. These power projection capabilities underpin the openness of the global commons. Krepinevich argues, “While generally underappreciated, the U.S. military’s role as the steward of the global commons—the world’s oceans in particular—has enabled the free movement of goods around the world, facilitating both general peace and prosperity.”[xxiv] Thus, challenges to U.S. power projection capabilities in the maritime, air, space, and cyberspace domains directly threaten the openness of the global commons.

## water

**No extinction**

Easterbrook 3(Gregg, senior fellow at the New Republic, “We're All Gonna Die!”, <http://www.wired.com/wired/archive/11.07/doomsday.html?pg=1&topic=&topic_set>=)

If we're talking about doomsday - the end of human civilization - many scenarios simply don't measure up. A single nuclear bomb ignited by terrorists, for example, would be awful beyond words, but life would go on. People and machines might converge in ways that you and I would find ghastly, but from the standpoint of the future, they would probably represent an adaptation. Environmental collapse might make parts of the globe unpleasant, but considering that the biosphere has survived ice ages, it wouldn't be the final curtain. Depression, which has become 10 times more prevalent in Western nations in the postwar era, might grow so widespread that vast numbers of people would refuse to get out of bed, a possibility that Petranek suggested in a doomsday talk at the Technology Entertainment Design conference in 2002. But Marcel Proust, as miserable as he was, wrote *Remembrance of Things Past* while lying in bed.

#### Their impact’s a lie.

Steven Milloy, Cato adjunct scholar, 6-20-2003, FOXNews, “Pesticide-Sperm Count Link Is Impotent,” [http://www.foxnews.com/story/0,2933,89913,00.html](http://www.foxnews.com/story/0%2C2933%2C89913%2C00.html)

“Scientists for the first time have shown a link between levels of widely used agricultural pesticides in men’s bodies and the number and quality of their sperm,” shrieked USA Today this week. Steady, USA Today (search). Underwear, rather than pesticides, is a more probable explanation. McNews had the wool pulled over its eyes by University of Missouri-Columbia eco-activist researcher Shanna Swan (search), who has been crusading since the mid-1990s to link pesticides with supposed reduced sperm counts. The latest chapter in Swan’s crusade began in April when she reported that a small sample of men from Boone County, Mo., had lower sperm quality than similarly small samples of men from Los Angeles, Minneapolis and New York City. Based on further “analysis,” Swan now reports in a study published in the June 18 Environmental Health Perspectives (search), the 50 Missouri men had higher levels of metabolites of widely used pesticides (search) (alachlor, diazinon, atrazine and others) in their urine than the 50 Minneapolis men. Swan concluded: “This is the first population-study to demonstrate links between specific biomarkers of environmental exposures and biomarkers of male reproduction in humans. Given the current widespread use of these pesticides, if further study confirms these findings, the implications for public health and agricultural practice could be considerable.” Doubtful. In the first place, I’m not quite sure what the dreaded “implications” of Swan’s data are since all men in the study were fertile. They were, in fact, the partners of pregnant women recruited at prenatal clinics. Secondly, there’s no known biological support for Swan’s idea that pesticides affect sperm quality. Tests do not indicate that alachlor, diazinon and atrazine, for example, produce toxic effects in the reproductive systems of laboratory animals. A reproductive biologist from the Environmental Protection Agency (search) told USA Today that rodent studies suggest that even the highest pesticide levels found in Swan’s subjects would have been too low to affect sperm quality. And just because the Missouri men had lower sperm counts and higher pesticide exposure than the Minneapolis men doesn’t automatically mean that pesticides have anything to do with sperm production. A University of Virginia fertility expert told The Associated Press that he was skeptical of the findings because of the lack of historical documentation of the effect of toxins on sperm. Sperm counts are known to vary geographically. There is no certain explanation for the phenomenon, although some studies indicate that men in colder regions seem to have higher sperm counts than men in warmer areas. And it’s really not surprising that men from the agricultural Boone County, Mo., would have more pesticide exposure than an urban area such as Minneapolis. Swan’s data simply aren’t unexpected and her tenuous conclusions aren’t surprising given her track record of eco-activist, anti-pesticide “research.” Though anti-pesticide activists (search) have tried for years to link pesticides with declining sperm counts, one key fact stands in their way -- there’s no evidence that sperm counts are even declining, much less that pesticides are involved. In 1999, researchers published in the Journal of Urology (search) a review of all 29 studies from 1938 to 1996 reporting semen analyses of fertile men. They concluded, “there appears to be no significant change in sperm counts in the U.S. during the last 60 years.” Sperm counts (search) and quality depend on many factors. One that Swan overlooked in her study was the effect of tight-fitting underwear. In 1996, Dutch researchers reported in the British medical journal The Lancet (search) the results of their study of the effect of underwear on sperm quality and quantity. They reported that men who wore tight-fitting underwear produced 50 percent less sperm than men who wore loose-fitting underwear. Sperm motility was reduced by two-thirds among the men who wore tight-fitting underwear. Maybe the Missouri men in Swan’s study wore tighter underwear than their Minneapolis counterparts. I don’t know. Neither does Swan -- she didn’t check. I do know that Swan has absolutely no evidence that implicates pesticides and exculpates all other potential factors. Regardless of the explanation for Swan’s reported observations, sperm quality differences apparently did not affect anyone’s fertility. Perhaps it’s time for Swan to spend time reconsidering the quality of her crusade.

## t

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

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

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

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

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

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

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

## qer

#### DoD already established its recommendations for SMR adoption

King 11

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

Recognizing nuclear power as a potential benefit to Department of Defense (DoD) facilities, Congress directed the DoD, in section 2845 of the National Defense Authorization Act (NDAA) of 2010, to “conduct a study to assess the feasibility of developing nuclear power plants on military installations” [12]. Specifically, the study is to consider the following topics:

• Options for construction and operation

• Cost estimates and the potential for life-cycle cost savings

• Potential energy security advantages

• Additional infrastructure costs

• Effect on the quality of life of military personnel

• Regulatory, state, and local concerns

• Effect on operations on military installations

• Potential environmental liabilities

• Factors that may impact safe colocation of nuclear power plants on military installations

• Other factors that bear on the feasibility of developing nuclear power plants on military installations.

To meet this requirement, the office of the Deputy Under Secretary of Defense for Installations and Environment, DUSD(I&E), asked CNA to conduct this feasibility study. The CNA effort was directed by a steering group consisting of representatives from DUSD (I&E), each of the military departments, DOE, NRC, and DOE Labs. This report documents our analysis and findings.

#### AND—It recommended against being an early adopter—proves the CP can’t establish a bureaucratic consensus for the plan

King 11

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

The most significant risk for SMR power plants is associated with being an early adoptor of new technology. From a DoD perspective, economic feasibility depends on negotiating arrangements for the project that ensure DoD is not responsible for FOAK expenses. Having contractor owners and operators would reduce operating risks associated with being an early adoptor. If partners can’t be found who are willing to bear the FOAK and early adoptor risks then DoD should not undertake such a project. The recent MOU between DOE and DoD identifies a framework for cooperation and partnership for sharing risks associated with this type of project.

#### No implementation

Barlas 12

Stephen, Columnist @ Financial Executive, 1/1, Lexis

But it is highly unlikely that Obama's blueprint will lead to a firmer footing for U.S. energy security than past so-called blueprints from other presidents, or perhaps more importantly, whether a print is even necessary. Obama's policy is a loosely knit set of policies that focus on producing more oil at home and reducing dependence on foreign oil by developing cleaner alternative fuels and greater efficiency. The Obama plan is not the result of any particular deep thinking or strategy. The President's Council of Advisors on Science and Technology (PCAST) called for the development of such a strategy in its November 2010 Report to the President on Accelerating the Pace of Change in Energy Technologies. Through an Integrated Federal Energy Policy. PCAST called for a Quadrennial Technology Review (QTR) as the first step in preparing a Quadrennial Energy Review. DOE completed the QTR in November 2011, six months after Obama published his blueprint. Steven E. Koonin, former undersecretary of Energy for Science, says QTR is limited in scope and all DOE felt it could get done given budget and time. "Technology development absent an understanding and shaping of policy and market context in which it gets deployed is not a productive exercise," he says. At this point there is no indication that DOE will even undertake the much more important QER, much less complete it any time soon. The larger reality is that any energy independence plan proposed by any U.S, president--whether based on a QER or not--has as much a chance of coming to fruition as Washington's football Redskins have of getting into the Super Bowl. But regardless of the rhetoric of president after president, maybe the U.S. doesn't even need an energy independence or energy security policy. Natural Gas Making Inroads The biggest energy input for industrial and commercial business users is natural gas. Natural gas prices are incredibly important, both because the fuel is used directly to run industrial processes, heat facilities and commercial buildings and make products such as fertilizers, pharmaceuticals, plastics and other advanced materials. Thanks to the shale revolution, EIA forecasts natural gas prices will stay low for the foreseeable future, rising to $4.66 m/BTU in 2015 and $5.05 m/BTU in 2020. That is good news for the owners of 15,000 to 17,000 industrial boilers in this country, most of which use natural gas (and many of those who still use coal are switching to natural gas). In addition, companies such as Dow Chemical Co. are restarting operations at facilities idled during the recession, Bayer AG is in talks with companies interested in building new ethane crackers at its two industrial parks in West Virginia and Chevron Phillips Chemical Co. and LyondellBasell Co., are considering expanding operations in the United States. Fracking has also had a much less remarked-upon effect on petroleum prices, which are important to businesses with transportation fleets. New oil sources are spurting from the Bakken (stretching from Canada to North Dakota and Montana) and Eagles Ford (South Texas) shale plays. U.S. oil prices have fallen from $133.88 a barrel of Texas intermediate crude in June 2008 to around $86.07. EIA predicts oil prices will rise to $94.58/bbl in 2015 and $108.10/bbl in 2020. Beyond the flood of natural gas washing over them, U.S. companies are also benefitting from three decades of investments--most of which were made without federal subsidies, or support--into facility energy efficiency. Ralph Cavanagh, co-director of the Energy Program at the Natural Resources Defense Council and a member of the Electricity Advisory Board at DOE, says the most important single solution for U.S. businesses worried about energy prices and access is aggressive energy efficiency. "Energy independence is the wrong issue," Cavanagh says. "It is reducing the cost of energy services and improving energy security. "U.S. business has done a tremendous job in energy efficiency over the past three decades," he adds. "It takes less than one-half of a unit of energy to create $1 of economic value than it did in 1973. Industry has done that by upgrading the efficiency of process equipment and upgrading lighting." Others may well argue that the U.S. needs, and has always needed, an energy policy, but one narrowly targeted. Kenneth B Medlock III, deputy director, Energy Forum at the James A Baker III Institute for Public Policy at Rice University, notes that DOE and the Gas Research Institute helped develop, with federal funding, the horizontal drilling (i.e. fracking) technology that Mitchell Energy and Development Corp. (now a part of Devon Energy Corp.) pioneered. "Government ought to be focused on research and development," Med-lock notes. He also is a supporter of loan guarantees to promote investment activity in frontier technologies, and argues that as long as there are more good bets than bad bets in that kind of portfolio, the funds committed in total are a good investment. But spectacular failures of energy companies such as Solyndra Corp., the Chapter 11 filing of Beacon Power Corp. and other less publicized busts reduce, if not kill, the prospect of any additional congressional funding for energy loan guarantees of any kind. That is true even when legislation has bipartisan support, which is the case for the Energy Savings and Industrial Competitiveness Act of 2011 (S. 1000), which would, among other things, provide grants for a revolving loan program designed to develop energy-saving technologies for industrial and commercial use. The bill passed the Senate Energy Committee by a vote of 18-3 in July. However, the Congressional Budget Office has pegged the cost of the bill's provisions at $1.2 billion over five years. That is a serious barrier to passage. And in any case, even if it did pass, the bill would simply authorize funding. Congressional appropriations committees would have to approve the money as part of DOE's budget, which would be highly unlikely, Solyndra aside, since similar programs authorized by the 2005 and 2007 energy bills are still begging for appropriations. Besides impact on the federal deficit, politics, too, often impede progress on otherwise sensible policies. Politics apparently have clogged up the proposed Keystone XL oil pipeline extension from Canada. Environmentalists, a Democratic constituency, oppose the project, arguing it would create more greenhouse gas emissions than necessary and pose a potential drinking water danger for Nebraska residents because it passed over the Ogallala Aquifer. That view is shared by Nebraska's Republican Gov. Dave Heineman, whose views are opposite those of all the can presidential candidates, each of whom supported U.S. approval of Keystone XL. Labor unions, another key Democratic constituency, support the project that TransCanada, the project sponsor, says will bring more than 11 8,000 person-years of employment to workers in the states of Montana, South Dakota and Nebraska. If the Keystone debate features Democrats versus Democrats and Republicans versus Republicans, efforts to substitute domestic natural gas for foreign petroleum features business versus business.

#### CP solvency requires transparency and presidential involvement—that proves it links to politics

PCAST 10

President’s Council of Advisors on Science and Technology (PCAST), Executive Office of the President, Co-Chaired by John P. Holdren, Assistant to the President for Science and Technology Director, Office of Science and Technology Policy, and Eric Lander, President, Broad Institute of Harvard and MIT, Nov 2010, REPORT TO THE PRESIDENT ON ACCELERATING THE PACE OF CHANGE IN ENERGY TECHNOLOGIES THROUGH AN INTEGRATED FEDERAL ENERGY POLICY, www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-energy-tech-report.pdf

A QER process would, in some sense, formulate an integrated energy policy for the twenty­first century. It will span mission and vision definition, strategy, and tactics. The QER and the process leading to it would provide an effective tool for Administration­wide coherence on energy and for effective dialog with Congress on a coordinated legislative agenda. **Presidential interest and engagement will be a necessary ingredient for success.**

**While the QER will be a product of the Administration, substantial input from the Congress**, the energy industry, academia, state and local governments, nongovernmental organizations, **and consumers will be essential throughout the process. Transparency in the process of gathering input for the QER will be key to the development of a sound product that can gain wide support.**

#### Biofuel fights now

Cardwell 12

Diane Cardwell, NYTimes, 8/27/12, Military SPending on Biofuels Draws Fire, www.nytimes.com/2012/08/28/business/military-spending-on-biofuels-draws-fire.html?pagewanted=all

When the Navy put a Pacific fleet through maneuvers on a $12 million cocktail of biofuels this summer, it proved that warships could actually operate on diesel from algae or chicken fat.

“It works in the engines that we have, it works in the aircraft that we have, it works in the ships that we have,” said Ray Mabus, secretary of the Navy. “It is seamless.”

The still-experimental fuels are also expensive — about $27 a gallon for the fuel used in the demonstration, compared with about $3.50 a gallon for conventional military fuels.

And that has made them a **flash point in a larger political battle** over government financing for new energy technologies.

“**You’re not the secretary of energy**,” Representative Randy Forbes, a Republican from Virginia, told Mr. Mabus as he criticized the biofuels program at a hearing in February. “You’re the secretary of the Navy.”

The House, controlled by Republicans, has already approved measures that would all but kill Pentagon spending on purchasing or investing in biofuels. A committee in the Senate, led by Democrats, has voted to save the program. **The fight will heat up again** when Congress takes up the Defense Department’s budget again in the fall.

The naval demonstration — known as the Great Green Fleet — was part of a $510 million three-year, multiagency program to help the military develop alternatives to conventional fuel. It is a drop in the ocean of the Pentagon’s nearly $650 billion annual budget.

## microgrids

#### Super vulnerable

Mo et al 12

(Yilin Mo received the Bachelor of Engineering degree from Department of Automation, Tsinghua University, Beijing, China, in 2007. He is currently working towards the Ph.D. degree at the Electrical and Computer Engineering Department, Carnegie Mellon University, Tiffany Hyun-Jin Kim received the B.A. degree in computer science from University of California at Berkeley, Berkeley, in 2002 and the M.S. degree in computer science from Yale University, New Haven, CT, in 2004. She is currently working towards the Ph.D. degree at the Electrical and Computer Engineering Department, Carnegie Mellon University, Kenneth Brancik completed a rigorous one year program in systems analysis at the former Grumman Data Information Systems in 1984 and an intensive two year program at Columbia University in the analysis and design of information systems in 1997. He received the M.S. degree in management and systems from New York University (NYU), New York, in 2002 and the Ph.D. degree in computing from Pace University, Dona Dickinson received the B.A. degree in industrial psychology from California State University, Heejo Lee received the B.S., M.S., and Ph.D. degrees in computer science and engineering from POSTECH, Pohang, Korea, Adrian Perrig received the Ph.D. degree in computer science from Carnegie Mellon University, Bruno Sinopoli received the Dr. Eng. degree from the University of Padova, Padova, Italy, in 1998 and the M.S. and Ph.D. degrees in electrical engineering from the University of California at Berkeley, “Cyber–Physical Security of a Smart Grid Infrastructure” “Proceedings of the IEEE” January 2012, Vol. 100, No. 1)

A wide variety of motivations exist for launching an attack on the power grid, ranging from economic reasons (e.g., reducing electricity bills), to pranks, and all the way to terrorism (e.g., threatening people by controlling electricity and other life-critical resources). The emerging smart grid, while benefiting the benign participants (consumers, utility companies), also provides powerful tools for adversaries. The smart grid will reach every house and building, giving potential attackers easy access to some of the grid components. While incorporating information technology (IT) systems and networks, the smart grid will be exposed to a wide range of security threats [5]. Its large scale also makes it nearly impossible to guarantee security for every single subsystem. Furthermore, the smart grid will be not only large but also very complex. It needs to connect different systems and networks, from generation facilities and distribution equipment to intelligent end points and communication networks, which are possibly deregulated and owned by several entities. It can be expected that the heterogeneity, diversity, and complexity of smart grid components may introduce new vulnerabilities, in addition to the common ones in interconnected networks and stand-alone microgrids [3]. To make the situation even worse, the sophisticated control, estimation, and pricing algorithms incorporated in the grid may also create additional vulnerabilities. The first-ever control system malware called Stuxnet was found in July 2010. This malware, targeting vulnerable SCADA systems, raises new questions about power grid security [6]. SCADA systems are currently isolated, preventing external access. Malware, however, can spread using USB drives and can be specifically crafted to sabotage SCADA systems that control electric grids. Furthermore, increasingly interconnected smart grids will unfortunately provide external access which in turn can lead to compromise and infection of components.

## at: russia

No war

Weitz 11 (Richard, senior fellow at the Hudson Institute and a World Politics Review senior editor 9/27/2011, “Global Insights: Putin not a Game-Changer for U.S.-Russia Ties,” <http://www.scribd.com/doc/66579517/Global-Insights-Putin-not-a-Game-Changer-for-U-S-Russia-Ties>)

Fifth, there will inevitably be areas of conflict between Russia and the United States regardless of who is in the Kremlin. Putin and his entourage can never be happy with having NATO be Europe's most powerful security institution, since Moscow is not a member and cannot become one. Similarly, the Russians will always object to NATO's missile defense efforts since they can neither match them nor join them in any meaningful way. In the case of Iran, Russian officials genuinely perceive less of a threat from Tehran than do most Americans, and Russia has more to lose from a cessation of economic ties with Iran -- as well as from an Iranian-Western reconciliation. On the other hand, these conflicts can be managed, since they will likely **remain limited and compartmentalized**. Russia and the West **do not have fundamentally conflicting vital interests of the kind countries would go to war over**. And as the Cold War demonstrated, nuclear weapons are a great pacifier under such conditions. Another novel development is that Russia is much more integrated into the international economy and global society than the Soviet Union was, and Putin's popularity depends heavily on his economic track record. Beyond that, there are objective criteria, such as the smaller size of the Russian population and economy as well as the difficulty of controlling modern means of social communication, that will constrain whoever is in charge of Russia.

#### Romney is posturing, Putin doesn’t care

Turkish Weekly 9/6/12

<http://www.turkishweekly.net/news/141414/romney%C3%ADs-tough-russia-rhetoric-an-election-ploy-analysts-say.html>

Romney’s Tough Russia Rhetoric An Election Ploy, Analysts Say But relations have also taken several high-profile hits recently, such as when Putin accused the United States of sponsoring the anti-Kremlin opposition rallies that erupted after last December’s parliamentary elections. The two countries have also locked horns on Syria, with U.S. officials accusing Russia of aiding and abetting Syrian strongman Bashar al-Assad. Kremenyuk notes it’s difficult to ascertain just how successful the U.S.-Russian “reset” truly was – and whether that trend could follow Romney to the White House. “Anyone can understand whatever he wants about the ‘reset’: an improvement? To some extent we improved [our relations],” he said. “But does that mean we have now finally identified a new agenda, what both nations want from each other? No.” For his part, Putin said Wednesday he is ready to work with the next U.S. president regardless of who wins in the November election, so long as that person is ready to work with Russia “Whoever the American public elects, we will work with them,” he told RT TV in an interview on Wednesday. “But we will work together only as effectively as our partners want to.” Lukyanov, of Russia in Global Affairs, said the Kremlin has largely taken Romney’s sharp comments with a grain of salt. “When Romney repeatedly said that Russia is the main geopolitical foe of the United States, it was actually perceived with irony, because no one – including the most hawkish Americans – believes that,” he said. “This is seen as a sign of his inexperience and very little interest [in Russia].”

#### Relations collapse inevitable—election irrelevant

Bovt 9/12/12

Georgy Bovt is a political analyst.

http://www.themoscowtimes.com/opinion/article/whether-obama-or-romney-the-reset-is-dead/467947.html

Whether Obama or Romney, the Reset Is Dead During every U.S. presidential election campaign, there is a debate in Russia over whether the Republican or Democratic candidate would be more beneficial for the Kremlin. Russian analysts and politicians always fail to understand that Americans have shown little interest in foreign policy since the end of the Cold War. Even when foreign policy is mentioned in the campaign, Russia is far down the list as a priority item. The volume of U.S-Russian trade remains small. The recent Exxon-Rosneft deal notwithstanding, U.S. interest in Russia's energy projects has fallen, particularly as the Kremlin has increased its role in this sector. To make matters worse, the United States is determined to establish clean energy and energy independence, while Russia's gas exports are feeling the pinch from stiff competition with the U.S. development of shale gas production. Of course, traditional areas of cooperation remain: the transit of shipments to and from Afghanistan through Russia, Iran's nuclear program and the struggle against international terrorism. But the transit route into Afghanistan cannot, by itself, greatly influence bilateral relations as a whole, and progress on the other two points seems to have reached a plateau beyond which little potential remains for bringing the two countries into closer cooperation. On the positive side, a new visa agreement came into force this week that will facilitate greater contact between both countries' citizens. But it will be years before that significantly influences overall U.S.-Russian relations. A new agreement regarding child adoptions has also been implemented after a few disturbing adoption stories prompted Russia's media, with the help of government propaganda, to spoil the U.S. image in Russia. Meanwhile, both U.S. President Barack Obama and Republican candidate Mitt Romney support the U.S. missile defense program in principle, although the exact form and scope of its deployment differ among the candidates. Even though President Vladimir Putin, during his interview with RT state television last week, expressed guarded optimism over the prospect of reaching an agreement on missile defense with Obama, Russia seems to underestimate the degree to which Americans are fixated on missile defense as a central component of their national security. It is highly unlikely that any U.S. administration — Democratic or Republican — will ever agree to major concessions on missile defense. It even seemed that Kremlin propagandists were happy when in March Romney called Russia the United States' No. 1 foe. They were given another present when Obama, addressing the Democratic National Convention last week, said Romney's comment only proved that he lacked foreign policy experience and was locked in Cold War thinking. For the next two months, however, the two candidates are unlikely to devote much attention to Russia. Russia's internal politics will also be one of the key factors shaping future U.S.-Russian relations. The two-year jail sentence slapped on three members of Pussy Riot for their anti-Putin prayer in Moscow's main cathedral has already become a subject of discussion between Foreign Minister Sergei Lavrov and U.S. Secretary of State Hillary Clinton. Even the most pragmatic "pro-reset" U.S. administration would criticize to one degree or another Russia's poor record on human rights. It appears that Russia is moving increasingly toward confrontation rather than rapprochement with the West. The Kremlin now seems fully committed to spreading the myth that the U.S. State Department is the cause behind most of Russia's domestic problems and is bent on undermining its national security by deploying missile defense installations in Europe and by supporting the opposition. There are other disturbing signals as well. Take, for example, the United Russia bill that would prohibit Russian officials from owning bank accounts and property overseas, with particular attention paid to their holdings in the West. The ideological underpinning of this bill is that assets located in the West are tantamount to betrayal of the motherland. Then there is Russia's opposition to the U.S. Magnitsky Act. The Kremlin interprets this initiative as yet another confirmation of its suspicions that Washington is conspiring against it and that the bill's real U.S. motive is to blackmail Russian officials by threatening to freeze their overseas bank accounts and property. An increase in these anti-Western attitudes does not bode well for U.S.-Russian relations, even if Obama is re-elected in November. Regardless of which candidate wins, the reset is bound to either slowly die a natural death under Obama or be extinguished outright under Romney. As a result, the most we can likely expect from U.S.-Russian relations in the next four years is cooperation on a limited range of mundane issues.

## at: space

#### Mars impossible

Launius 10 – (2010, Roger, PhD, Curator, Planetary Exploration Programs, National Air and Space Museum, expert on Aerospace history, fellow and board member of the American Astronautical Society, “Can we colonize the solar system? Human biology and survival in the extreme space environment,” Endeavour Volume 34, Issue 3, September 2010, Pages 122-129, science direct, )

Although microbial life might survive the extreme conditions of space, for Homo sapien sapiens the space environment remains remarkably dangerous to life. One space life scientist, Vadim Rygalov, remarked that ensuring human life during spaceflight was largely about providing the basics of human physiological needs. From the most critical – meaning that its absence would cause immediate death, to the least critical – these include such constants available here on Earth of atmospheric pressure, breathable oxygen, temperature, drinking water, food, gravitational pull on physical systems, radiation mitigation, and others of a less immediate nature. As technologies, and knowledge about them, stand at this time, humans are able to venture into space for short periods of less than a year only by supplying all of these needs either by taking everything with them (oxygen, food, air, etc.) or creating them artificially (pressurized vehicles, centrifugal force to substitute for gravity, etc.).10 Spaceflight would be much easier if humans could go into hibernation during the extremes of spaceflight, as did the Streptococcus mitis bacteria. Resolving these issues has proven difficult but not insurmountable for such basic spaceflight activities as those undertaken during the heroic age of space exploration when the United States and the Soviet Union raced to the Moon. Overcoming the technological hurdles encountered during the Mercury, Gemini, and Apollo programs were child's play in comparison to the threat to human life posed by long duration, deep space missions to such places as Mars. Even the most sophisticated of those, the lunar landings of Project Apollo, were relatively short camping trips on an exceptionally close body in the solar system, and like many camping trips undertaken by Americans the astronauts took with them everything they would need to use while there. This approach will continue to work well until the destination is so far away that resupply from Earth becomes highly problematic if not impossible if the length of time to be gone is so great that resupply proves infeasible. There is no question that the U.S. could return to the Moon in a more dynamic and robust version of Apollo; it could also build a research station there and resupply it from Earth while rotating crews and resupplying from Earth on a regular basis. In this instance, the lunar research station might look something like a more sophisticated and difficult to support version of the Antarctic research stations. A difficult challenge, yes; but certainly it is something that could be accomplished with presently envisioned technologies.11 The real difficulty is that at the point a lunar research station becomes a colony profound changes to the manner in which humans interact with the environment beyond Earth must take place. Countermeasures for core challenges – gravity, radiation, particulates, and ancillary effects – provide serious challenges for humans engaged in space colonization (Figure 4).

#### Lack of human spaceflight is inevitable–economic conditions

Sharp 11

(Jason S. Sharp graduated magna cum laude with a B.B.A. in finance from Texas Tech University in 2002. Before law school, he served three years as the deputy press secretary for the National Aeronautics and Space Administration, THE 2010 NASA AUTHORIZATION ACT: LEGISLATORS AS ROCKET SCIENTISTS AND OTHER IMPLICATIONS FOR AMERICA'S HUMAN SPACEFLIGHT PROGRAM, Summer, 2011, 76 J. Air L. & Com. 595)

In addition to the difficulties ahead in implementing the 2010 Act, there are several additional challenges facing America's human spaceflight program. The first challenge is whether NASA can accomplish the tasks before it in an era of economic uncertainty. Secondly, now that the precedent has been set that a new administration can redirect a developing human spaceflight program that receives broad congressional support, support from Congress may erode as members tire of supporting each administration's plans for human spaceflight. This erosion could eventually leave the United States without human access to space. With the current economic conditions, there are several uncertainties regarding the agency's funding; however, **one thing is clear: huge budget increases are** likely **out of the question**. House appropriators are working to reduce most domestic federal [\*628] agency budgets to fiscal year 2008 levels. n245 Additionally, President Obama's Fiscal Year 2012 Budget Request proposed continuing NASA's enacted 2010 budget of $ 18.7 billion and notionally projected the next five years to remain at that amount. n246 This amount represents more than NASA's 2008 budget of $ 17.3 billion but is $ 300 million less than the projected $ 19.0 billion for fiscal year 2012 that NASA projected in its fiscal year 2011 budget. n247 But, "appropriators are looking to protect the budgets for agencies such as NASA." n248 The significant possibility of stagnant or lower budgets for the next few years, combined with NASA's acknowledgement that the new vehicles likely will not be available for flight before December 2016, likely means that the United States will not have a government-owned capability for human access to space through at least the end of President Obama's second term (assuming President Obama runs and is re-elected for a second term). **Without a vehicle in operation, there is likely nothing to prevent a new administration from again cancelling NASA's human spaceflight plans** and replacing them with its own. At that point, there is the risk that members of Congress will tire of spending billions on a new proposal with each new president and will simply decline to fund the new plans. n249 Dr. Scott Pace, Director of George Washington University's Space Policy Institute, agreed by saying, "If this were to occur, I would see a decline and loss of U.S. leadership." n250 He also sees an ever more dire situation "of the United States being out of the human spaceflight business" if the ISS fails before a commercial or government system becomes available because there will not be a [\*629] commercially justifiable human flight destination in low-Earth orbit. n251

## elections

#### Obama win is locked in—too many routes to victory

Robert Shrum, Daily Beast, 10/26/12, Robert Shrum: Why Obama Will Win, www.thedailybeast.com/articles/2012/10/26/robert-shrum-why-obama-will-win.html

Obama’s strategists knew the Romney spin was and is as ephemeral as the air it’s spoken on. For Romney may be the last refuge of a candidate who dares not be candid—who has to hide his beliefs and commitments in a fog of political presumption. But if you see past the smoke and mirrors, you will understand that Barack Obama continues to command the electoral landscape. After the debacle in Denver, I argued that the structure of the race hadn’t fundamentally changed—and wouldn’t unless the president faltered again in the second debate. He didn’t. He let Romney into the game; state and national polls did tighten—mostly because undecideds who lean Republican and voted for McCain moved to Romney. They would have anyway. Now the surge is receding—and contrary to the conventional verdict, the second and third debates not only stemmed Romney gains, but restored Obama’s advantage. Even the outlier of outliers, the flawed Gallup tracking poll, which recently accorded Romney a seven-point lead, shows him only three ahead in a seven-day average—which means the numbers will almost certainly shift further toward the president as the bad days drop out of the average. Gallup drives news, but it’s increasingly discounted by political analysts. The Greenberg survey for the Democracy Corps—a rare survey in which 33 percent of the respondents were reached on their cellphones—has Obama leading 49 to 46 percent. It’s not a big lead—and never will be. But the president has other big advantages that will prove decisive. And here is where the fundamentals haven’t changed. The outcome will be decided in the battleground states—and here Obama has many more paths to a 270 electoral-vote majority. For example, he could lose Ohio—and still get there if he took New Hampshire, Wisconsin, Iowa, and Colorado. But Ohio is anything but lost; after dispensing with the GOP-infected numbers of Rasmussen, and the figments of the fly-by-night pollsters, the president has a consistent margin of 4 to 5 percent—and is at or near 50 percent. Similarly, in the new PPP data, he is five points up in Virginia with 51 percent of the vote. In Nevada, Mark Melman, who almost alone called Senator Harry Reid’s 2010 triumph, shows Obama eight ahead. One of Republican Governor Brian Sandoval’s top advisers has bluntly predicted: “Obama will carry the state.” The adviser may not keep his job, but the president will take Nevada. So it goes across the swing states, even in Florida and except in North Carolina. But there, the Obama campaign has registered a legion of new voters—and everywhere it has the most in-depth, technologically sophisticated, and well-staffed turnout operation in history. That can and will make the difference where the contest is close. The president has twice as many field offices as Romney—800 of them across the battlegrounds. And Romney’s are afterthoughts—late to the game, run by the Republican National Committee, and without the rich, data-based voter targeting of the Obama effort. A GOP operative in Colorado says he adds two to four points to the president’s poll numbers in the state because Obama has a better organization. Finally, Romney can run, but he can’t hide—from the Bain ads that are on the air again in the Midwest, from the relentless Obama focus on the choice between a candidate who stands for the middle class and a candidate who favors the 1 percent. Now he faces the prospect of explaining his 1991 testimony in a post-divorce lawsuit against the founder of Staples—which has been unsealed by a court in Boston. This could be the next chapter in the story of a business career that was his calling card, but has become a political liability. Stuff just keeps happening to Mitt Romney. He has to flee the press to avoid answering questions about the only Senate candidate he’s made an ad for—Indiana’s Richard Mourdock, who suddenly dominated the national news with his repugnant divination that a pregnancy due to rape is “something God intended.” Romney can’t bring himself to pull the endorsement ad; he’s too afraid of his own right-wing shadow. He can’t escape the extremists in his party with whom he fellow-travelled as he pandered his way to the nomination. Thus the gender gap widens—and the moderate makeover unravels. Mitt is mired in the mid-20s with Hispanics, who heard him say “illegals” should “self-deport.” He’s far behind with younger voters—and the Obama organization will get them to the polls, with an assist from Romney’s position on social issues like reproductive rights and marriage equality. The restrictive voter-ID laws have mostly been struck down, at least for this year, and blacks and other minorities won’t be blocked from casting their ballots. Blue-collar workers in the Midwest can’t forgive Romney’s opposition to saving the auto industry—and they don’t trust the man from Bain. Even his lead among seniors is being eroded by his plan to replace Medicare with Vouchercare—and to raise the cost of their prescription drugs. That’s why enough of the battleground states, where the campaign is being fully engaged, will be Obama country on Election Night. The brief silly cycle of spin about the impending, even inevitable Romney presidency is ending.

#### The public loves nuclear—newest polling and be skeptical of their link authors

Westenhaus 9/30/12

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

The Nuclear Energy Institute announced a September telephone survey in a press release suggesting almost two thirds of U.S. adults favor the use of nuclear energy as one of the ways to provide electricity in the United States. This latest survey found that Americans strongly favoring nuclear energy outnumber those strongly opposed by a two-to-one ratio, 29% versus 14%. The new numbers improve on a poll conducted in September 2011, six months after the Fukushima accident, when 62% of American favored nuclear energy, with 35% opposed. The new survey shows confidence is improving. Just over three quarters of respondents agree that nuclear energy facilities operating in the United States are ‘safe and secure,’ while only 19% think they are not. Eighty percent of Americans opposed to 16% believe “we should learn the lessons from the Japanese accident and continue to develop advanced nuclear energy plants to meet America’s growing electricity demand.” In a shock to the political system and the anti nuclear crowd a large majority (81%) of those surveyed favor the renewal of operating licenses of facilities that continue to meet federal safety standards, while 74% believe electric utilities should prepare now so they will be ready to build new nuclear power plants in the next decade if needed.

#### Plan not perceived by voters—Hurricane Sandy

Bob King, Politico, 10/26/12, Election in Sandy's shadow, dyn.politico.com/printstory.cfm?uuid=938E15A3-DAB9-4528-8471-303B15DEC7CC

4) The distraction: As with Hurricane Irene last year, Sandy is threatening the media epicenters of New York and Washington, guaranteeing that the networks will be in All Storm All the Time mode just as Obama and Romney are trying to make their final pitches to voters. That leaves a lot less time for talking heads to parse the details of Obama’s jobs plans, the economic policy speech that Romney gave Friday in Iowa, Friday’s report on GDP growth or whether it was right for the president to call his opponent a “bull——er.” This could mostly hurt Obama, who still trails in many national tracking polls and has been trying to recapture the momentum he had in September. Or it could keep Romney from closing the deal in states where he’s still behind, like Ohio.

# 1AR

## at: efficiency

#### Warming takes out any chance for domestic solutions

Tir ‘10

(Jaroslav, PhD, University of Illinois, Urbana-Champaign, 2001) Dr. Tir's specialty is international relations, with a focus on causes and management of armed conflicts. His research spans the topics of territorial disputes, environmental conflict and security, domestic and ethnic conflict, and diversionary theory of war. Dr. Tir's work has been published in outlets such as the American Journal of Political Science, Journal of Politics, Journal of Conflict Resolution, Journal of Peace Research, International Studies Quarterly, Conflict Management and Peace Science, and others, and Douglas, assistant professor in the Department of International Affairs in the School of Public and International Affairs at the University of Georgia, “Coping with the Consequences of Climate Change: International Institutions as Strategies for Mitigating Conflict over Water Resources,” AM)

Aside from triggering disputes, climate-induced water stress can lead to the escalation of those disputes over rivers and increase the use of coercive diplomacy. Whereas competing uses of a water source might be manageable politically during normal times, conditions of scarcity can make states less likely to wait for diplomatic options to resolve conflicts. For example, the increased sensitivity to water issues can lead to a more combative response to the damming of a river. Downstream states may use threats or overt military force as a bargaining tactic to coerce upstream states into limiting water diversion. The increased value of the water source to both sides will zone of agreement shrink and increase the attractiveness of coercive bargaining. This expectation has received some empirical support. In a study of competing river claims, Hensel, Mitchell, and Sowers (2006) find that water scarcity increases the likelihood of militarized conflicts between states with an existing riparian dispute. This has been the case with the political and military tensions between Syria and Turkey, due to construction by Turkey of dams on the Euphrates. A similar dynamic has also occurred in the Nile basin, with Egypt opposing diversion attempts by upstream states.

#### Upstream/downstream key

Pearce 5/14/9

<http://seedmagazine.com/content/article/the_truth_about_water_wars/>

 Fred Pearce is an environmental journalist and author of numerous books, including When the River Runs Dry: Water—The Defining Crisis of the 21st Century.

 Water, unlike land, is hard to “capture.” It flows. As Barnaby points out, countries have a lot of reasons for cooperating over water that flows between nations. And many do. She’s also right in acknowledging the importance of trade in thirsty products like food—often termed “virtual water.” There would have been many more wars in the Middle East in the past 30 years but for this trade, which keeps Egypt, Jordan, and others fed. But that approach will not always work. There are serious potential conflicts around the world where upstream countries can withhold water from arid downstream countries that need or want it. India and Pakistan constantly bicker over the Indus. How long will a fully functioning Iraqi state settle for Turkey controlling the flow of the Tigris and Euphrates with large dams? Meanwhile Egypt’s insistence on its prior right to the majority of the flow of the Nile is an unresolved tension afflicting a quarter of a continent. If wars arise over grievances, then water is a common source of grievances between nations. Israeli and Palestinian technocrats may cooperate over day-to-day water management, but that does not stop an absolute ban, imposed by Israel, on West Bank Palestinians sinking new wells to tap water beneath their feet. Water is a major grievance there. And as water shortages become more intense in much of the world over the coming decades, the potential for conflicts will grow. It is dangerous to “blame” a resource like water for wars. It can too easily become an excuse for failing to resolve conflicts. To “blame” water for genocide in Sudan is obscene. But to go to the other extreme and deny water as a potential factor in wars is equally foolish. Yes, management of water can become a meeting point for nations as well as a source of conflict. But many rivers and other sources of water that cross international boundaries are today not subject to treaties for sharing. That is dangerous. If we are to avoid water wars, there is an urgent need for more water diplomacy.

#### Population growth makes efficiency useless

Tom Blees 8, president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, on the board of The World Energy Forum, “Prescription for the Planet”, <http://www.thesciencecouncil.com/pdfs/P4TP4U.pdf> \*GREAT= Nuclear energy consortium

Whether you find such arguments credible or not, there can be no denying that resource wars have been fought for decades and stand a very good chance of continuing and even escalating in the future, especially with rapid growth of both economies and populations. Resource wars aren’t always about oil, of course. The Israeli “incursion” into Lebanon in the summer of 2006 not surprisingly saw Israel continuing its northward push to the banks of the Litani River, which they’ve coveted for its valuable water supply and have been fighting over for decades. (Their 1978 attack into Lebanon was called, probably not coincidentally, Operation Litani.) While the threat of global warming is clearly reason enough to implement the agenda proposed in this book, the prevention of wars over resources would be a boon to mankind. Ever since the Japanese tried to gain control over their oil supply by conquering the Dutch East Indies in a desperate move that was instrumental in precipitating their war with the United States in 1941,238 the predominant cause of resource wars has been oil. Yet with the planet’s burgeoning population, and with drought conditions likely worsening due to the inescapable effects of global warming, much speculation has centered on future wars over water. Over a billion people around the world lack safe water today, resulting in the premature deaths of millions every year. Yet this deplorable situation is dwarfed by the prediction that, if we continue with business as usual, about two-thirds of the world’s population will face shortages of clean freshwater by 2025.239 Here, too, GREAT would be able to head off almost certain strife. Along with completely defusing the oil issue, every nation would have the advantage of abundant energy supplies, with as much as necessary channeled into desalination and/or canal projects. Indeed, the Soviet breeder/desalination project in what is now Kazakhstan has already proven the concept. In fact, four different countries have an accumulated 247 reactor-years of experience with nuclear desalination.240 Desalination is an energy-intensive process, as is the pumping required in long-distance canal projects. Yet both these tactics will have to be employed as the world’s human population continues to expand. Even without the population factor, the fact that many glaciers that have provided fresh water for millions of people are now melting is creating a crisis situation that is worsening every year. In areas where canal projects could move water from areas of plenty to areas in need, the energy demand has usually been the limiting factor. It is, after all, no great feat to build a canal. The Romans and many others were doing it thousands of years ago. Pumping the water uphill periodically, though, in order to extend the distance the water can travel, is the tough part. To get an idea of just how much energy that seemingly simple process entails, think of it the other way: consider how much electricity is provided by falling water in a hydroelectric dam. Whether they are to be met by desalination or long-distance canals, water needs require massive amounts of electricity (or heat, in the case of some desalination systems). Unfortunately many of the people most in need of fresh water live in grinding poverty and can afford to pay little if anything for the water they so desperately need. If the world is going to avoid water wars and crises in the future, energy is going to be a pivotal factor. GREAT would supply it in abundance to any nation in its orbit. Wars over water—one of the most ominous resource shortages looming on the geopolitical horizon—can thus be preemptively resolved. “If we could ever competitively—at a cheap rate—get fresh water from salt water,” observed President John Kennedy nearly 50 years ago, “that would be in the long-range interest of humanity, and would really dwarf any other scientific accomplishment.”241 We now have that capability. Hopefully we’ll be wise enough to use it sooner rather than later.

## central asia – at: impact d

#### No diplomacy or institutions

Adam Radin 10, masters in security studies from the naval postgraduate school, “the security implications of water: prospects for instability or cooperation in south and central asia”, March, <http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA518674>

Water, an issue so important to numerous facets of each state’s economy and overall stability, must not be left to loosely observed and nonbinding agreements. Tajikistan has even gone as far as to appeal to the United Nations General Assembly to focus on the “Central Asia water dilemma.”142 In a region that is still developing, and where the government’s survival rely more on its relations with it people versus its regional neighbors, domestic needs will continue to trump international cooperation. As Linn notes in his plan, the need for global actors to take an active role is likely needed in order for sustained cooperation. Additionally, this also provides an opportunity for Russia to actively insert itself through diplomacy and infrastructural investments, seeing that they still consider the CARs under their sphere of influence.143

The chapter presents a contrasting case study to South Asia, as in Central Asia water is not viewed as a regional security issue, but in terms of fulfilling short-term domestic needs. Without the looming threat of conflict or significant retribution from regional neighbors, cooperation is consistently undervalued and abandoned once domestic pressures increase. The problem with this pattern is that resources will likely continue to deteriorate and the CARs will continue to be dependent on each other to provide water and energy. Without sustained and flexible cooperation, the region at the very least will see greater stresses on government to provide for their populations, leading to domestic and potential regional instability.

## indo-pak – at: impact d

#### Increased scarcity short-circuits diplomacy

Dr Shaheen Akhtar 10 – date inferred, research fellow at the Centre for Regional Studies, “Emerging Challenges To Indus Waters Treaty”, <http://irs.org.pk/f310.pdf>

The growing water stress in Pakistan and India is shaping discourse on water between the two countries. The increase in water stress in the two countries since the early 1990s has also put strain on the IWT. This debate is mainly driven by the growing demand, decreasing availability of fresh water resources and degree of their dependence on the transboundary water resources. Water scarcity is often measured using Falkenmark’s Water Stress Index (WSI) which divides the volume of available water resources for each country by its population. If the resulting average amount of water available per inhabitant falls short of a certain threshold value (1700 m3 per year) the country is considered to be “water stressed”, if falling short of 1,000 m3 per person per year, it is considered “water scarce” and finally, if falling short of 500 m3 per person per year, it is considered “water poor.”(28) Going by this Water Stress Index India has become a “water stressed” country while Pakistan a “water scarce” country.

In March 2009, a group of more than 20 different UN bodies warned that, since water has become the latest cause stoking tensions between India and Pakistan, the world may be perilously close to its first water war. The report observed that “water is linked to the crises of climate change, energy and food supplies and prices, and troubled financial markets.”….“Unless their links with water are addressed and water crises around the world are resolved, other crises may intensify and local water crises may worsen, converging into a global water crisis and leading to political insecurity and conflict at various levels.”(29) As such water has become a geopolitical issue in the ongoing hostility and rivalry and distrust between the two countries.

## oceans

#### massive size of oceans checks snowball and ensures slow timeframe.

Bjørn Lomborg, Director, Environmental Assessment Institute, THE SKEPTICAL ENVIRONMENTALIST, ‘1 p. 189

But the oceans are so incredibly big that our impact on them has been astoundingly insignificant - the oceans contain more than 1,000 billion liters of water. The UN’s overall evaluation of the oceans concludes: “The open sea is still relatively clean. Low levels of lead, synthetic compounds and artificial radionuclides, though widely detectable, are biologically insignificant.

Marked

Oil slicks and litter are common among sea leans, but are, at present, a minor consequences to communities of organisms living in ocean waters.

## cp

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

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

Amory Lovins has long argued that the traditional grid is vulnerable to this sort of damage. Lovins proposed a paradigm shift from centralized to distributed generation and from fossil fuels and nuclear power to renewable based micro-generation. Critics have pointed to flaws in Lovins model. Renewable generation systems are unreliable and their output varies from locality to locality, as well as from day to day, and hour to hour. In order to bring greater stability and predictability to the grid, electrical engineers have proposed expanding the electrical transmission system with thousands of new miles of transmission cables to be added to bring electricity from high wind and high sunshine areas, to consumers. This would lead, if anything, to greater grid vulnerability to storm damage in a high renewable penetration situation. Thus Lovins renewables/distributed generation model breaks down in the face of renewables limitations. Renewables penetration, will increase the distance between electrical generation facilities and customer homes and businesses, increasing the grid vulnerable to large scale damage, rather than enhancing reliability. Unfortunately Lovins failed to note that the distributed generation model actually worked much better with small nuclear power plants than with renewable generated electricity. Small nuclear plants could be located much closer to customer's homes, decreasing the probability of storm damage to transmission lines.

Marked

At the very worst, small NPPs would stop the slide toward increased grid expansion. Small reactors have been proposed as electrical sources for isolated communities that are too remote for grid hookups. If the cost of small reactors can be lowered sufficiently it might be possible for many and perhaps even most communities to unhook from the grid while maintaining a reliable electrical supply. It is likely that electrical power will play an even more central role in a post-carbon energy era. Increased electrical dependency requires increased electrical reliability, and grid vulnerabilities limit electrical reliability. Storm damage can disrupt electrical service for days and even weeks. In a future, electricity dependent economy, grid damage can actually impede storm recovery efforts, making large scale grid damage semi-self perpetuating. Such grid unreliability becomes a threat to public health and safety. Thus grid reliability will be a more pressing future issue, than it has been. It is clear that renewable energy sources will worsen grid reliability, Some renewable advocates have suggested that the so called "smart grid" will prevent grid outages. Yet the grid will never be smart enough to repair its own damaged power lines. In addition the "smart grid" will be venerable to hackers, and would be a handy target to statures. A smart grid would be an easy target for a Stuxnet type virus attack. Not only does the "smart grid" not solve the problem posed by grid vulnerability to storm damage, but efficiency, another energy approach thought to be a panacea for electrical supply problems would be equally useless. Thus, decentralized electrical generation through the use of small nuclear power plants offers real potential for increasing electrical reliability, but successful use of renewable electrical generation approaches may worsen rather than improved grid reliability.

## at: russia – 1ar defense

#### Rhetoric irrelevant, calculation will prevail

Pifer 9/24/12

<http://valdaiclub.com/usa/49240.html>

Valdai International Discussion club interviewed Steven Pifer, Director of the Brookings Arms Control Initiative and a senior fellow in the Center on the United States and Europe.

I don’t believe that we will go back to the Cold War, if governor Romney wins, but our relations can deteriorate, if the US takes a more aggressive stand, for example, on Iran, or Syria issue. Is that possible? With Governor Romney, if he becomes president, when he takes office in January, he is going to find that the geopolitical reality is that on some issues he needs Russian cooperation. Or, it would be more likely that he can achieve his goals with Russian cooperation. For example, American and Russian interests, regardless of who is president, are going to coincide on Afghanistan. Neither wants to see failure in Afghanistan, the Americans because they would like to leave with some sense that theirs was a successful effort, the Russians because they don’t want to see the return to an unstable or Taliban-dominated Afghanistan that is a threat to Central Asia. So, there would be cooperation there. On Iran there has been some rhetoric on Romney’s side that Russia won’t be helpful. But Russia has come a long way on its Iran policy. In 2002-2003, when I was in the government, nobody would have predicted that Russia would go to the point of adopting an arms embargo on Iran. And, as president, Romney will understand that working with Russia on Iran makes sense. So, some of the realities will force cooperation. The tone might be a little bit different, but then he would have to decide how much to push on questions where he disagrees with Russian policy, because you always have to balance them against other questions. You want to defend your interests when there are differences, and there will be differences on issues such as Syria. But how much do you want to push those issues if it undercuts your ability to cooperate on other questions? So, the real change, by judging from what you are saying, would be in rhetoric? Certainly, there will be a difference in tone, but we have to wait and see. When President Obama came to office, people both on the National Security Council and at the State Department said early on that they wanted a better relationship with Russia. That was because they thought that, to achieve some of their goals – to mobilize pressure on Iran, to have easier access to Afghanistan – having Russian support would make achieving those goals easier. And they also recognized that, in order to get that support, they would have to show some responsiveness to the issues which were of concern to the Russians.

## No Change Extn

#### Ground game makes high Dem turnout inevitable—polls irrelevant

Molly Ball, The Atlantic, 10/24/12, Obama's Edge: The Ground Game That Could Put Him Over the Top, www.theatlantic.com/politics/archive/2012/10/obamas-edge-the-ground-game-that-could-put-him-over-the-top/264031/

Forget the polls, the debates, the last-minute ads and volleys of insults. This is how the Obama campaign plans to win the election. Four years ago, Barack Obama built the largest grassroots organization in the history of American politics. After the election, he never stopped building, and the current operation, six years in the making, makes 2008 look like "amateur ball," in the words of Obama's national field director Jeremy Bird. Republicans insist they, too, have come a long way in the last four years. But despite the GOP's spin to the contrary, there's little reason to believe Mitt Romney commands anything comparable to Obama's ground operation. And this time, Obama may actually need it. Though he trounced John McCain organizationally four years ago, the irony was that Obama didn't really need his sophisticated field organization. Riding a wave of voter enthusiasm and Bush fatigue, and crushing McCain with fundraising and TV ad spending, Obama almost certainly would have won the 2008 election anyway. The political operative's rule of thumb is that organization can increase your share of the vote by two percentage points; Obama won the national popular vote by seven points. One academic study looked at Obama's edge in field offices and concluded they probably put a couple of extra states in his column, but he would have won without them. This year is different. The polls are so close that a lively partisan meta-fight has broken out over which side actually has the upper hand going into the final stretch, with Romney claiming momentum is on his side, while Obama clings to slim leads in enough swing states to take the Electoral College. In an election that's tied in the polls going down to the wire, Obama's ground game could be crucial. In the closing days of the race, "we have two jobs," Obama campaign manager Jim Messina said Tuesday. "One, to persuade the undecideds, and two, to turn our voters out." The former is the job of the president and his TV and other media ads. As for the latter, "That's the grassroots operation we've been building for the last 18 months." The Field-Office Gap While Obama's office in Sterling is one of more than 800 across the country -- concentrated, of course, in the swing states -- Romney commands less than half that number, about 300 locations. In the swing states, the gap is stark. Here's the numerical comparison in what are generally considered the top three swing states -- Ohio, Florida and Virginia: But the difference isn't just quantitative, it's qualitative. I visited Obama and Romney field offices in three swing states -- Ohio, Colorado and Virginia -- dropping in unannounced at random times to see what I could see. There were some consistent, and telling, differences. Obama's office suite in Sterling was in an office park next to a dentist's office. The front window was plastered with Obama-Biden signs, the door was propped open, and the stink bugs that plague Virginia in the fall crawled over stacks of literature -- fliers for Senate candidate Tim Kaine, Obama bumper stickers -- piled on a table near the front reception desk. In rooms in front and back, volunteers made calls on cell phones, while in the interior, field staffers hunched over computers. One wall was covered with a sheet of paper where people had scrawled responses to the prompt, "I Support the President Because...", while another wall held a precinct-by-precinct list of neighborhood team leaders' email addresses. Only about a mile down the road was the Republican office, a cavernous, unfinished space on the back side of a strip mall next to a Sleepy's mattress outlet. On one side of the room, under a Gadsden flag ("Don't tread on me") and a poster of Sarah Palin on a horse, two long tables of land-line telephones were arrayed. Most of the signs, literature, and buttons on display were for the local Republican congressman, Frank Wolf. A volunteer in a Wolf for Congress T-shirt was directing traffic, sort of -- no one really seemed to be in charge and there were no paid staff present, though there were several elderly volunteers wandering in and out. The man in the T-shirt allowed me to survey the room but not walk around, and was unable to refer me to anyone from the Romney campaign or coordinated party effort. These basic characteristics were repeated in all the offices I visited: The Obama offices were devoted almost entirely to the president's reelection; the Republican offices were devoted almost entirely to local candidates, with little presence for Romney. In Greenwood Village, Colorado, I walked in past a handwritten sign reading "WE ARE OUT OF ROMNEY YARD SIGNS," then had a nice chat with a staffer for Rep. Mike Coffman. In Canton, Ohio, the small GOP storefront was dominated by "Win With Jim!" signs for Rep. Jim Renacci. Obama's nearest offices in both places were all Obama. In Canton, a clutch of yard signs for Sen. Sherrod Brown leaned against a wall, but table after table was filled with Obama lit -- Veterans for Obama, Women for Obama, Latinos for Obama, and so on. The Obama campaign uses cell phones exclusively, while the Republicans use Internet-based land line phones programmed to make voter calls. Every Obama office has an "I Support the President Because..." wall, covered with earnest paeans to Obamacare and the like. In a technical sense, the Romney campaign actually does not have a ground game at all. It has handed over that responsibility to the Republican National Committee, which leads a coordinated effort intended to boost candidates from the top of the ticket on down. The RNC says this is an advantage: The presidential campaign and the local campaigns aren't duplicating efforts, and the RNC was able to start building its ground operation to take on Obama in March, before Romney had secured the GOP nomination. "The Romney campaign doesn't do the ground game," Rick Wiley, the RNC's political director, told me. "They have essentially ceded that responsibility to the RNC. They understand this is our role." The disadvantage of this is that the RNC is composed of its state Republican Parties, which vary dramatically in quality. States like Florida and Virginia have strong Republican operations, while those in Iowa and Nevada haven't recovered from attempted takeovers by Ron Paul partisans, and the Ohio GOP still bears the scars of a protracted leadership fight earlier in the year.

#### The election isn’t over, but that doesn’t mean new information changes it

Nate Cohn, 10/27/12, 2004 And The Possibility Of A Shift In Ohio , www.tnr.com/blog/electionate/109242/2004-and-the-possibility-shift-in-ohio

With just ten days to go, it’s an open question whether Mitt Romney can make a comeback in Ohio. As Nate Silver noted today, the polls are getting accurate at this late stage, and the odds strongly favor Obama maintaining a lead in Ohio polls heading into Election Day. That might be especially true this year, since the polls have been remarkably consistent, Obama has already banked a lead among early voters, and it's hard to imagine advertisements making a late difference after months of airing beyond saturation levels. If Obama still leads by 2 or 3 points in Ohio in ten days, the risk of a Romney victory would hinge on the possibility of a systemic error in the polls. It happens, but not especially often. Still, while the odds are against a late Romney turnaround, it's not impossible. It’s worth recalling the Ohio polls from this time in 2004, which showed Kerry tied or slightly ahead. Starting with the polls conducted over these very dates eight years ago, Bush took a slight and consistent lead in Ohio and never relented. From this point onward, Kerry only led in one poll of Ohio (Gallup, of course), where the RealClearPolitics average showed Bush holding a 2.1 point lead on Election Day. A similar lurch toward the right would bring about a tied race in the Buckeye State in 2 Whether the movement in the polls was attributable to a genuine shift in the race or something else is impossible to say. But 2004 reminds us that late movement in the numbers is still possible, even if it's generally unlikely and even in the most pivotal state. Still, it's unlikely that Romney will go into Election Day as a favorite in Ohio. If Ohio lurches two points toward Romney, that would only indicate a tied race and Obama would still have a 50-50 shot. As a result, Obama is a clear favorite. If the polls stay where they are, which is the likeliest scenario, Obama would be a heavy favorite on Election Day, with Romney's odds reduced to the risk of systemic polling failure. Harry Reid can tell you all about the risk of systemic polling failure, but it's still an unlikely scenario. There's also the chance that the race tightens, but, even then, Obama would still have a 50-50 shot. Viewed collectively, Obama's odds look pretty good--but there's still ten days to go and '04 reminds us that those ten days can occassionally make a difference.

#### New information won’t impact swing voters

Chris Cillizza, WaPo, 10/9/12, Who are the “undecided” voters? And what the heck are they waiting for?, www.washingtonpost.com/blogs/the-fix/wp/2012/10/09/who-are-the-undecided-voters-and-what-are-the-heck-are-they-waiting-for/

Even if you agree with Ayres, however, it’s tough to know what message works to persuade broad swaths of them. Because so many of these undecideds are low information voters, crafting a message that works is next to impossible. They could just as well make up their mind based on the last person’s ad they saw on TV or what their girlfriend’s brother told them as any specific message being directed their way by the microtargeting arms of the two campaigns.

## AT: Plan Overwhelms

#### Demographics compensate for any loses from the plan

Nate Cohn, New Republic Election Expert, Part-Time Georgetown Coach -- his articles go through a TNR editing process and are available for all on his blog, he has been profiled on New York Magazine and MSNBC, 10/1/12, Obama’s College Voter Trump Card, [www.tnr.com/blog/electionate/107974/obamas-college-voter-trump-card](http://www.tnr.com/blog/electionate/107974/obamas-college-voter-trump-card)

Even if turnout among these voters is down 18 percent—and that’s beneath 2004, by the way—the total number of young, disproportionately non-white, and Obama-friendly voters actually increases from 23.5 to 25.7 million.

Even in this relatively low-turnout scenario, 6.5 million new 18-22 year olds will enter the electorate and they can go a long way toward helping Obama compensate for declining turnout among ’08 voters or an increase in conservative turnout. If they vote 63-37 for Obama, the president would net-1.7 million voters.

If non-white or young voters turned out at ’08-levels in 2012, demographics would actually ensure that Obama does even better than he did four years ago. These same demographic trends give Democrats a bit of breathing room to withstand modest declines in enthusiasm among young voters without actually falling far behind where they stood four years ago.

With this in mind, it’s no surprise that Obama opened his campaign at Ohio State University, or that Michelle Obama is holding rallies on college campuses across the battleground states. Today’s college students didn’t vote four years ago, and even an underwhelming turnout from America's most diverse age group could help the Obama campaign make up for losses among voters who have abandoned their cause since 2008.

## Hurricane Sandy 1AR

#### Overwhelms the plan in key swing states

Bob King, Politico, 10/26/12, Election in Sandy's shadow, dyn.politico.com/printstory.cfm?uuid=938E15A3-DAB9-4528-8471-303B15DEC7CC

Could Hurricane Sandy be our October surprise? The possibility of a killer cyclone from the tropics delivering a gut punch to the U.S. East Coast just before Election Day, threatening tens of millions of voters with soggy devastation and a possible burst of snow, was probably not a factor in any candidate’s game plan. But it’s suddenly all too real. The pre-Halloween hurricane is already affecting the presidential race, prompting both Mitt Romney and Vice President Joe Biden to cancel scheduled appearances this weekend in Virginia Beach. It’s unknown whether it will do the same to a planned campaign stop Monday by President Barack Obama with former President Bill Clinton in Prince William County, Va. Beyond that, Sandy has scrawled a giant, blustery question mark on a crucial stretch of the political calendar. The National Hurricane Center’s latest forecast projects Sandy will be either at or near hurricane strength by the time it hooks into the mid-Atlantic coast late Monday or early Tuesday morning. It swept through the Bahamas early Friday after killing 40 people across the Caribbean. The center of the sprawling storm’s projected path targets Delaware and Maryland, but that projection comes with huge amounts of uncertainty. The territory that could feel the brunt of 57 mph or greater winds — equivalent to at least a strong tropical storm — stretches from North Carolina to Massachusetts, and includes chunks of battleground states North Carolina, Virginia and Pennsylvania. Some states, such as Virginia and Maryland, have already issued emergency declarations. “This is a very dangerous scenario,” the National Weather Service’s Philadelphia-area office warned in a briefing Friday morning. The agency said likely impacts include major flash and river flooding, along with storm tides of as much as 5 feet in the Chesapeake Bay and 10 feet in Delaware Bay, worsened by the effects of Sunday’s full moon. Forecasters advised that some areas will be exposed to strong winds from the slow-crawling storm for up to two days straight. Beyond that, Sandy could merge with an eastward-moving winter storm and cold air flowing from Canada to form what the media is calling a “Frankenstorm,” which could drop as much as 2 feet of snow on West Virginia, with lighter dustings in parts of Ohio and Pennsylvania Not even the experts are confident how this all will play out. “Sandy is a loose, unpredictable cannon,” said MIT climate researcher Kerry Emanuel, author of the 2005 book “Divine Wind: The History and Science of Hurricanes.” For one thing, he noted that late October hurricanes usually affect the Caribbean, not the U.S. East Coast. “The only thing we’re confident in is that it’s a large and dangerous storm and could have widespread effects,” National Hurricane Center specialist Eric Blake said Friday evening. And that makes Sandy one last wildcard in a razor-thin presidential race that has already taken plenty of strange loops. Here are some ways the storm could affect the outcome — with plenty of potential down side for either Obama or Romney. 1) Early voting: Voting is under way in some states in Sandy’s potential path — including North Carolina, where state election officials are preparing for the worst. “Those counties that are already prone to flooding are already making plans for if they need to relocate resources like voting equipment,” said Veronica Degraffenreid, a liaison at the North Carolina State Board of Elections. She said board Executive Director Gary Bartlett also has emergency powers to suspend early voting in some locations if he deems it necessary. “We would take steps to ensure the safety of voters and election officials,” she said. That wouldn’t be great news for Democrats, who have been pushing as many of their supporters as possible to vote early in states that allow it. That would be doubly true in Ohio, another early-voting state — and an all but indispensable state for both Obama’s and Romney’s electoral maps. Maryland Gov. Martin O’Malley’s administration is also monitoring the storm to determine whether changes will be needed to the state’s early voting schedule, The Associated Press reported. Early voting is scheduled to start Saturday in Florida, which isn’t in Sandy’s direct path but is getting a lashing as the storm roars past. 2) Is Election Day at risk? What happens if the damage is severe enough to disrupt Election Day itself — or at least dissuade a sizable number of voters from going to the polls? One historical parallel is the two-week postponement of the New York mayoral primary that was originally scheduled for Sept. 11, 2001. But that wasn’t a national election. The possibility of a delay has already come up in Virginia, where the AP says Gov. Bob McDonnell has pointed out he has the authority to postpone the election in extreme calamities — though that’s highly unlikely. Short of all-out mayhem, emergencies can create shortages of poll workers or ballots, knock out phone systems or electricity, or force the relocation of polling places, according to a 2007 guide from the U.S. Election Assistance Commission. The guide urges election officials to “review existing State law to determine if the Governor has the power to cancel an election or designate alternative methods for distribution of ballots.” Officials are less worried about any delays in Pennsylvania, which harbors memories of widespread flooding from Hurricane Agnes in 1972. “We are confident that the situation of the weather will be handled before the election day, before we have to take steps to consider such an option,” said Matthew Keeler, spokesman for the Pennsylvania Department of State. He added that county boards of election can petition a judge to extend polling hours on Nov. 6 if needed. (Pennsylvania doesn’t have early voting.) Consolation for Obama: Many of the states in Sandy’s path — such as Maryland, New Jersey and New York — are solidly in the blue column anyway. Officials in at least one of the vulnerable states have been through this kind of drill before: The elections office in St. Lucie County, Fla., was flooded by Tropical Storm Fay just a week before its August primaries in 2008, but the election went off without a hitch. 3) The Katrina factor: Any disaster offers a chance for a president to step up and come to the aid of the public, or stumble and be regarded as a goat. In this case, Obama will have little time to recover if he fails to respond properly to Sandy — or if Republicans successfully plant the meme that he failed. The classic example of what not to do, of course, is George W. Bush’s lagging response to 2005’s Hurricane Katrina, which forever shadowed the rest of his presidency and helped Democrats take back Congress a year later.

#### Prevents new campaign messages

Michael Barbaro, NYTimes, 10/26/12, Fears of Storm Disrupting Final Days of Campaign, www.nytimes.com/2012/10/27/us/politics/fears-of-hurricane-sandy-disrupting-final-days-of-campaign.html

But some of those plans were in doubt Friday as Hurricane Sandy gathered strength in the Atlantic and headed north. Forecasters said it could slam into the coast somewhere between Virginia and New York early next week, potentially disrupting the campaign in its final 10 days. Sandy is expected to be a strong — perhaps historic — tropical storm that could cause severe coastal flooding, intense wind damage and knock out power to millions of people for days. The candidates may find it harder to push last-minute messages if they are competing with the images of a large, threatening storm. That could have a particularly outsize impact in Virginia, a key battleground state, if the storm hits that far south.

#### Makes the disad’s predictions useless

Brendan Loy, Weather Nerd, 10/25/12, How Hurricane Sandy Could Seriously Disrupt the Election, pjmedia.com/weathernerd/2012/10/25/hurricane-sandy-could-seriously-disrupt-the-election/?singlepage=true

• Evacuations causing massive disruption and controversy. Imagine for a moment that Hurricane Katrina had hit a week before a presidential election, and that Louisiana and Mississippi had been swing states. I actually can’t really imagine it — the disruption would have been unbelievable, the controversy uncontainable, the outcome unpredictable. How on earth do you handle a situation where thousands upon thousands of voters are, through no fault of their own, displaced at the last minute — missing whatever absentee or mail-in ballot deadlines might have existed — and consequently unable to vote? You can’t locally delay the election without creating an unfair and legally questionable situation (more on that in a moment), but it’s also obviously unacceptable to have a whole swaths of voters disenfranchised. I don’t care if those voters are Republicans or Democrats: it’s undemocratic and un-American to have a storm wipe out, or substantially dilute, a whole region’s voice in a national election.