# 1AC

### Advantage 1- Islanding

#### Small nuclear reactors key to prevent bases from being vulnerable to inevitable grid outages- the impact is nuclear war

Andres and Breetz 11

(Richard B. Andres is Professor of ¶ national Security Strategy at the ¶ national War College and a Senior fellow and energy and environmental ¶ Security and Policy Chair in the Center ¶ for Strategic research, institute for national Strategic Studies, at the national Defense University. Hanna L. Breetz is a doctoral candidate in the Department of Political Science at the Massachusetts institute of technology, “Small Nuclear Reactors ¶ for Military Installations:¶ Capabilities, Costs, and ¶ Technological Implications” Institute for National Strategic Studies, <http://www.ndu.edu/press/lib/pdf/strforum/sf-262.pdf>, SEH)

Grid Vulnerability. DOD is unable to provide its ¶ bases with electricity when the civilian electrical grid is ¶ offline for an extended period of time. Currently, domestic military installations receive 99 percent of their ¶ electricity from the civilian power grid. As explained in a ¶ recent study from the Defense Science Board:¶ DOD’s key problem with electricity is that critical ¶ missions, such as national strategic awareness and ¶ national command authorities, are almost entirely ¶ dependent on the national transmission grid . . . ¶ [which] is fragile, vulnerable, near its capacity ¶ limit, and outside of DOD control. In most cases, ¶ neither the grid nor on-base backup power provides¶ sufficient reliability to ensure continuity of critical ¶ national priority functions and oversight of ¶ strategic missions in the face of a long term (several ¶ months) outage.¶ 7¶ The grid’s fragility was demonstrated during the 2003 ¶ Northeast blackout in which 50 million people in the ¶ United States and Canada lost power, some for up to a ¶ week, when one Ohio utility failed to properly trim trees. ¶ The blackout created cascading disruptions in sewage ¶ systems, gas station pumping, cellular communications, ¶ border check systems, and so forth, and demonstrated the ¶ interdependence of modern infrastructural systems.¶ 8¶ More recently, awareness has been growing that ¶ the grid is also vulnerable to purposive attacks. A report sponsored by the Department of Homeland Security suggests that a coordinated cyberattack on the grid ¶ could result in a third of the country losing power for ¶ a period of weeks or months.¶ 9¶ Cyberattacks on critical ¶ infrastructure are not well understood. It is not clear, for ¶ instance, whether existing terrorist groups might be able ¶ to develop the capability to conduct this type of attack. It ¶ is likely, however, that some nation-states either have or ¶ are working on developing the ability to take down the ¶ U.S. grid. In the event of a war with one of these states, ¶ it is possible, if not likely, that parts of the civilian grid ¶ would cease to function, taking with them military bases ¶ located in affected regions.¶ Government and private organizations are currently ¶ working to secure the grid against attacks; however, it is ¶ not clear that they will be successful. Most military bases ¶ currently have backup power that allows them to function for a period of hours or, at most, a few days on their ¶ own. If power were not restored after this amount of time, ¶ the results could be disastrous. First, military assets taken ¶ offline by the crisis would not be available to help with disaster relief. Second, during an extended blackout, global ¶ military operations could be seriously compromised; this ¶ disruption would be particularly serious if the blackout ¶ was induced during major combat operations. During the ¶ Cold War, this type of event was far less likely because the United States and Soviet Union shared the common understanding that blinding an opponent with a grid blackout could escalate to nuclear war. America’s current opponents, however, may not share this fear or be deterred ¶ by this possibility.¶ In 2008, the Defense Science Board stressed that ¶ DOD should mitigate the electrical grid’s vulnerabilities by turning military installations into “islands” of ¶ energy self-sufficiency.¶ 10¶ The department has made efforts to do so by promoting efficiency programs that ¶ lower power consumption on bases and by constructing ¶ renewable power generation facilities on selected bases. ¶ Unfortunately, these programs will not come close to ¶ reaching the goal of islanding 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.

#### Grids goes down- laundry list of reasons

Slavo 7/12

(Mac is editor of shftplan, “UPDATE: Cascading Grid Crash: Now 600 Million Without Power in India (Are We Vulnerable?)” <http://www.shtfplan.com/headline-news/paralysis-grid-down-in-india-370-million-left-without-power_07302012>, SEH)

The power grid in the United States, while more advanced and apparently better maintained, is also under excessive strain as has been witnessed in recent years with rolling brownouts, blackouts, and unforeseen crashes resulting from key component failure.¶ One industry insider who has worked in the utility industry for nearly two decades advised this author recently that it wouldn’t take much to bring down the system even in the United States, potentially affecting tens of millions of customers. Though it’s the 21st century, many grid components in operation are, in some cases, as much as 40 years old, thus replacement parts are almost impossible to find. Other components, like massive transformers may take weeks or months to replace. In the event of a scenario where multiple components are targeted simultaneously, by either a man-made EMP or natural event, it is not too far of a stretch to suggest that the afflicted regions would be engulfed in pandemonium.¶ This potential for widespread failure is so plausible that former Congressman Roscoe Bartlett, who has spoken on the vulnerabilities of the US power grid, has advised that Those Who Can, Should Move Their Families Out Of the City:¶ After Hurricane Ike passed through the Houston area 2008 some 90% of the metropolitan was without power. While hospitals, police and critical infrastructure was restored within a few days, residents in outlying suburban areas experienced the outage for over three weeks. We witnessed the rapid loss of patience, increased anxiety and frustration, and the subsequent breakdown of interpersonal interaction at high-demand venues such as gas stations, where long lines, screaming matches and even fist fights became a common occurrence.¶ The bottom line: As demonstrated in India today, Quebec in 1989 (caused by a geo-magnetic storm originating from the sun), Ike in 2008, Hurricane Irene on the East coast in 2012 and the plethora of incidents that have taken place over the last couple of decades, the North American power grid, just as India’s, is susceptible to far-from-equilibrium situations, and sometimes it takes extended periods of time to get power up and running.¶ With just three major grids running the United States, our dependence on massive flows of electricity to power our home air conditioners, food refrigeration, communications, water and gas pump systems, and daily business operations could come to a screeching halt should the grid ever be struck by a natural disaster like a solar coronal mass ejection or a large-scale earthquake in California or on the Madrid fault. Likewise, as we’ve noted previously, rogue organizations looking to wreak havoc have already demonstrated the staggering security holes in our power, water and oil grid infrastructure, with leading cyber security firms noting that it is just a matter of time before disaster strikes.¶ While a short-term, isolated metropolitan outage can be dealt with by sourcing labor and supplies from unaffected areas of the country, considering that the US operates on three key power grid systems, a region-wide outage affecting just one of these nodes could lead to a cascading breakdown in the electrical power system that envelops the entire country.¶ The most dangerous possibility emerges when we look at threats posed by the sun or a rogue terror cell or nation that could deploy an Electro-Magnetic Pulse weapon (EMP / Super EMP) over American skies. It’s been surmised that either one of these possibilities could cause damage so staggering that the grid would be down for months, leaving millions without just-in-time food and gas delivery systems, medical care, local emergency response, or even clean water. According to one estimate, some 90% of Americans would die in such a scenario if the power wasn’t restored within one year.¶ Thus, it is clear that our power grids are a critical lifeline to keeping life as we know it in the world today operational. And, as we have seen historically and India this morning, power grids can and do crash – even in countries with hundreds of millions of residents.

#### Cyber-attack is coming ---actors are probing grid weaknesses

**Reed 10/11** John, Reports on the frontiers of cyber war and the latest in military technology for Killer Apps at Foreign Policy, "U.S. energy companies victims of potentially destructive cyber intrusions", 2012, killerapps.foreignpolicy.com/posts/2012/10/11/us\_energy\_companies\_victims\_of\_potentially\_destructive\_cyber\_attacks

Foreign actors are probing the networks of key American companies in an attempt to gain control of industrial facilities and transportation systems, Defense Secretary Leon Panetta revealed tonight.¶ "We know that foreign **cyber actors are probing America's critical infrastructure networks**," said Panetta, disclosing previously classified information during a speech in New York laying out the Pentagon's role in protecting the U.S. from cyber attacks. "They are targeting the computer control systems that operate chemical, **electricity** and water plants, and those that guide transportation thorough the country."¶ He went on to say that the U.S. government knows of "specific instances where intruders have gained access" to these systems -- frequently known as Supervisory Control and Data Acquisition (or SCADA) systems -- and that "they are seeking to create advanced tools to attack these systems and cause panic, destruction and even the loss of life," according to an advance copy of his prepared remarks.¶ The secretary said that **a coordinated attack on enough critical infrastructure could be a "cyber Pearl Harbor" that would "cause physical destruction and loss of life, paralyze and shock the nation, and create a profound new sense of vulnerability.**"¶ While there have been reports of criminals using 'spear phishing' email attacks aimed at stealing information about American utilties, Panetta's remarks seemed to suggest more sophisticated, nation-state backed attempts to actually gain control of and damage power-generating equipment. ¶ Panetta's comments regarding the penetration of American utilities echo those of a private sector cyber security expert Killer Apps spoke with last week **who said that the networks of American electric companies were penetrated, perhaps in preparation for a Stuxnet-style attack**.¶ Stuxnet is the famous cyber weapon that infected Iran's uranium-enrichment centrifuges in 2009 and 2010. Stuxnet is believed to have caused some of the machines to spin erratically, thereby destroying them.¶ "**There is hard evidence** that there has been penetration of our power companies, and given Stuxnet, that is a staging step before destruction" of electricity-generating equipment, the expert told Killer Apps. Because uranium centrifuges and power turbines are both spinning machines, "**the attack is identical -- the one to take out the centrifuges and the one to take out our power systems is the same attack**."¶ "If a centrifuge running at the wrong speed can blow apart" so can a power generator, said the expert. "If you do, in fact, spin them at the wrong speeds, you can blow up any rotating device."¶ Cyber security expert Eugene Kaspersky said two weeks ago that one of his greatest fears is someone reverse-engineering a sophisticated cyber weapon like Stuxnet **-- a relatively easy task** -- and he noted that Stuxnet itself passed through power plants on its way to Iran. "Stuxnet infected thousands of computer systems all around the globe, I know there were power plants infected by Stuxnet very far away from Iran," Kaspersky said.

**Defense doesn’t apply---Stuxnet changed the game**

**Gross 11** Michael Joseph, Vanity Fair contributing editor, he covers topics including politics, technology, and national security, has also written extensively for The New York Times, The Boston Globe, and GQ, attended Williams College, and later studied at Princeton Theological Seminary. After graduating, he wrote speeches for Massachusetts Governor William Weld, “A Declaration of Cyber-War”, April, http://www.vanityfair.com/culture/features/2011/04/stuxnet-201104?currentPage=all

Regardless of how well it worked, there is no question that Stuxnet is something new under the sun. At the very least, it is a blueprint for a new way of **attacking industrial-control systems**. In the end, the most important thing now publicly known about Stuxnet is that Stuxnet is **now publicly known.** That knowledge is, on the simplest level, a warning: **America’s own critical infrastructure is a sitting target for attacks like this**. That aside, if Stuxnet really did attack Iran’s nuclear program, it could be called the first unattributable act of war. The implications of that concept are confounding. Because cyber-weapons pose an almost **unsolvable problem of sourcing**—who pulled the trigger?—war could evolve into something **more and more like terror**. Cyber-conflict makes military action more like a **never-ending game of uncle**, where the fingers of weaker nations are perpetually bent back. The wars would often be secret, waged by members of anonymous, elite brain trusts, none of whom would ever have to look an enemy in the eye. For people whose lives are connected to the targets, the results could be **as catastrophic as a bombing** **raid, but would be even more disorienting**. People would suffer, but would never be certain whom to blame.¶ **Stuxnet is the Hiroshima of cyber-war**. That is its true significance, and all the speculation about its target and its source should not blind us to that larger reality. **We have crossed a threshold, and there is no turning back**.

**Grid failure wrecks US critical mission operations**

**Stockton 11** Paul, assistant secretary of defense for Homeland Defense and Americas’ Security Affairs, “Ten Years After 9/11: Challenges for the Decade to Come”, <http://www.hsaj.org/?fullarticle=7.2.11>

The cyber threat to the DIB is only part of a much larger challenge to DoD. Potential adversaries are seeking asymmetric means to cripple our force projection, warfighting, and sustainment capabilities, by targeting the critical civilian and defense supporting assets (within the United States and abroad) on which our forces depend. This challenge is not limited to man-made threats; DoD must also execute its mission-essential functions in the face of disruptions caused by naturally occurring hazards.20 Threats and hazards to DoD mission execution include incidents such as earthquakes, naturally occurring pandemics, solar weather events, and industrial accidents, as well as kinetic or virtual attacks by state or non-state actors. Threats can also emanate from insiders with ties to foreign counterintelligence organizations, homegrown terrorists, or individuals with a malicious agenda. From a DoD perspective, this global convergence of unprecedented threats and hazards, and vulnerabilities and consequences, is a particularly problematic reality of the post-Cold War world. Successfully deploying and sustaining our military forces are increasingly a function of interdependent supply chains and privately owned infrastructure within the United States and abroad, including transportation networks, cyber systems, commercial corridors, communications pathways, and energy grids. This infrastructure largely falls outside DoD direct control. Adversary actions to destroy, disrupt, or manipulate this highly vulnerable homeland- and foreign-based infrastructure may be relatively easy to achieve and extremely tough to counter. Attacking such “soft,” diffuse infrastructure systems could significantly affect our military forces globally – potentially blinding them, neutering their command and control, degrading their mobility, and isolating them from their principal sources of logistics support. The Defense Critical Infrastructure Program (DCIP) under Mission Assurance seeks to improve execution of DoD assigned missions to make them more resilient. This is accomplished through the assessment of the supporting commercial infrastructure relied upon by key nodes during execution. By building resilience into the system and ensuring this support is well maintained, DoD aims to ensure it can "take a punch as well as deliver one."21 It also provides the department the means to prioritize investments across all DoD components and assigned missions to the most critical issues faced by the department through the use of risk decision packages (RDP).22 The commercial power supply on which DoD depends exemplifies both the novel challenges we face and the great progress we are making with other federal agencies and the private sector. Today’s commercial electric power grid has a great deal of resilience against the sort of disruptive events that have traditionally been factored into the grid’s design. Yet, the grid will increasingly confront threats beyond that traditional design basis. This complex risk environment includes: disruptive or deliberate attacks, either physical or cyber in nature; severe natural hazards such as geomagnetic storms and natural disasters with cascading regional and national impacts (as in NLE 11); long supply chain lead times for key replacement electric power equipment; transition to automated control systems and other smart grid technologies without robust security; and more frequent interruptions in fuel supplies to electricity-generating plants. These risks are magnified by globalization, urbanization, and the highly interconnected nature of people, economies, information, and infrastructure systems. The department is highly dependent on commercial power grids and energy sources. As the largest consumer of energy in the United States, DoD is dependent on commercial electricity sources outside its ownership and control for secure, uninterrupted power to support critical missions. In fact, approximately 99 percent of the electricity consumed by DoD facilities originates offsite, while approximately 85 percent of critical electricity infrastructure itself is commercially owned. This situation only underscores the importance of our partnership with DHS and its work to protect the nation’s critical infrastructure – a mission that serves not only the national defense but also the larger national purpose of sustaining our economic health and competitiveness. DoD has traditionally assumed that the commercial grid will be subject only to infrequent, weather-related, and short-term disruptions, and that available backup power is sufficient to meet critical mission needs. As noted in the February 2008 Report of the Defense Science Board Task Force on DoD Energy Strategy, “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.”23 Similarly, a 2009 GAO Report on Actions Needed to Improve the Identification and Management of Electrical Power Risks and Vulnerabilities to DoD Critical Assets stated that DoD mission-critical assets rely primarily on commercial electric power and are vulnerable to disruptions in electric power supplies.24 Moreover, these vulnerabilities may cascade into other critical infrastructure that uses the grid – communications, water, transportation, and pipelines – that, in turn, is needed for the normal operation of the grid, as well as its quick recovery in emergency situations. To remedy this situation, the Defense Science Board (DSB) Task Force recommended that DoD take a broad-based approach, including a focused analysis of critical functions and supporting assets, a more realistic assessment of electricity outage cause and duration, and an integrated approach to risk management that includes greater efficiency, renewable resources, distributed generation, and increased reliability. DoD Mission Assurance is designed to carry forward the DSB recommendations. Yet, for a variety of reasons – technical, financial, regulatory, and legal – DoD has limited ability to manage electrical power demand and supply on its installations. As noted above, DHS is the lead agency for critical infrastructure protection by law and pursuant to Homeland Security Presidential Directive 7. The Department of Energy (DOE) is the lead agency on energy matters. And within DoD, energy and energy security roles and responsibilities are distributed and shared, with different entities managing security against physical, nuclear, and cyber threats; cost and regulatory compliance; and the response to natural disasters. And of course, production and delivery of electric power to most DoD installations are controlled by commercial entities that are regulated by state and local utility commissions. The resulting paradox: DoD is dependent on a commercial power system over which it does not – and never will – exercise control.

#### Military vulnerability risks eviscerates the military and risks nuclear war

The Examiner 7/27

(Robert Tilford, Graduate US Army Airborne School, Ft. Benning, Georgia, “Cyber attackers could shut down the electric grid for the entire east coast” <http://www.examiner.com/article/cyber-attackers-could-easily-shut-down-the-electric-grid-for-the-entire-east-coa>, SEH)

To make matters worse a cyber attack that can take out a civilian power grid, for example could also cripple the U.S. military.¶ The senator notes that is that the same power grids that supply cities and towns, stores and gas stations, cell towers and heart monitors also power “every military base in our country.”¶ “Although bases would be prepared to weather a short power outage with backup diesel generators, within hours, not days, fuel supplies would run out”, he said.¶ Which means military command and control centers could go dark.¶ Radar systems that detect air threats to our country would shut¶ Down completely.¶ “Communication between commanders and their troops would also go silent. And many weapons systems would be left without either fuel or electric power”, said Senator Grassley.¶ “So in a few short hours or days, the mightiest military in the world would be left scrambling to maintain base functions”, he said.¶ We contacted the Pentagon and officials confirmed the threat of a cyber attack is something very real.¶ Top national security officials—including the Chairman of the Joint Chiefs, the Director of the National Security Agency, the Secretary of Defense, and the CIA Director— have said, “preventing a cyber attack and improving the nation’s electric grids is among the most urgent priorities of our country” (source: Congressional Record).¶ So how serious is the Pentagon taking all this?¶ Enough to start, or end a war over it, for sure (see video: Pentagon declares war on cyber attacks http://www.youtube.com/watch?v=\_kVQrp\_D0kY&feature=relmfu ).¶ A cyber attack today against the US could very well be seen as an “Act of War” and could be met with a “full scale” US military response.¶ That could include the use of “nuclear weapons”, if authorized by the President.

**Loss of mission effectiveness causes nuclear war in every hotspot**

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

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

#### We control empirics

Wohlforth 8—Daniel Webster Professor of Government, Dartmouth. BA in IR, MA in IR and MPhil and PhD in pol sci, Yale (William, Unipolarity, Status Competition, and Great Power War, October 2008, World Politics Vol. 61, Iss. 1; pg. 28, 31 pgs, Proquest)

Despite increasingly compelling findings concerning the importance of status seeking in human behavior, research on its connection to war waned some three decades ago.38 Yet empirical studies of the relationship between both systemic and dyadic capabilities distributions and war have continued to cumulate. If the relationships implied by the status theory run afoul of well-established patterns or general historical findings, then there is little reason to continue investigating them. **The clearest empirical implication** of the theory **is that** status **competition is unlikely to cause great power military conflict in unipolar systems**. If status competition is an important contributory cause of great power war, then, ceteris paribus, unipolar systems should be markedly less war-prone than bipolar or multipolar systems. And this appears to be the case. As Daniel Geller notes in a review of the empirical literature: "**The only polar structure that appears to influence conflict probability is unipolarity**."39 In addition, a larger number of studies at the dyadic level support the related expectation that narrow capabilities gaps and ambiguous or unstable capabilities hierarchies increase the probability of war.40 These studies are based entirely on post-sixteenth-century European history, and most are limited to the post-1815 period covered by the standard data sets. Though the systems coded as unipolar, near-unipolar, and hegemonic are all marked by a high concentration of capabilities in a single state, these studies operationalize unipolarity in a variety of ways, often very differently from the definition adopted here. An ongoing collaborative project looking at ancient interstate systems over the course of two thousand years suggests that historical systems that come closest to the definition of unipolarity used here exhibit precisely the behavioral properties implied by the theory. 41 As David C. Kang's research shows, the East Asian system between 1300 and 1900 was an unusually stratified unipolar structure, with an economic and militarily dominant China interacting with a small number of geographically proximate, clearly weaker East Asian states.42 Status politics existed, but actors were channeled by elaborate cultural understandings and interstate practices into clearly recognized ranks. Warfare was exceedingly rare, and the major outbreaks occurred precisely when the theory would predict: when China's capabilities waned, reducing the clarity of the underlying material hierarchy and increasing status dissonance for lesser powers. Much more research is needed, but initial exploration of other arguably unipolar systems-for example, Rome, Assyria, the Amarna system-appears consistent with the hypothesis.43 Status Competition and Causal Mechanisms Both theory and evidence demonstrate convincingly that competition for status is a driver of human behavior, and social identity theory and related literatures suggest the conditions under which it might come to the fore in great power relations. Both the systemic and dyadic findings presented in large-N studies are broadly consistent with the theory, but they are also consistent with power transition and other rationalist theories of hegemonic war.

### Advantage 2- Desalination

#### Global water scarcity’s inevitable–causes war and kills billions

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>

The battles of yesterday were fought over land. Those of today are over energy. But the battles of tomorrow may be over water. Along with population growth and increasing per capita water consumption, massive pollution of the world's surface water systems has placed a great strain on remaining supplies of clean fresh water. Global deforestation, destruction of wetlands, dumping of pesticides and fertilizer into waterways, and global warming are all taking a terrible toll on the Earth's fragile water system. The combination of increasing demand and shrinking supply has attracted the interest of global corporations who want to sell water for a profit. The water industry is touted by the World Bank as a potential trillion-dollar industry. Water has become the “blue gold” of the 21st century. In many parts of the world, one major river supplies water to multiple countries. Climate change, pollution and population growth are putting a significant strain on supplies. In some areas renewable water reserves are in danger of dropping below the 500 cubic meters per person per year considered a minimum for a functioning society. In recent times, several studies around the globe show that climatic change is likely to impact significantly upon freshwater resources availability. In India, demand for water has already increased manifold over the years due to urbanization, agriculture expansion, increasing population, rapid industrialization and economic development. At present, changes in cropping pattern and land-use pattern, over-exploitation of water storage and changes in irrigation and drainage are modifying the hydrological cycle in many climate regions and river basins of India. Due to warming and climate change rainfall trend has been badly affected worldwide. This change has adversely affected the groundwater recharge. Water scarcity is expected to become an even more important problem than it is today. In a case study of Jharkhand state of India groundwater recharging is mainly dependent on rainfall. Though Jharkhand receives sufficient amount of rainfall (900 to 1400 mm/year) but from last several years the rainfall pattern is very erratic. From last two years Ranchi city the capital of Jharkhand state received sufficient rainfall but distribution of rainfall was not uniform. It rained heavily just for two to three days in the month of August and September which resulted in heavy runoff and less infiltration affecting groundwater level. The process of urbanization and industrialization from last 20 years has caused changes in the water table of Jharkhand State of India as a result of decreased recharge and increased withdrawal. Many of the small ponds which were main source of water in the surrounding areas are now filled for different construction purpose affecting the water table. By 2100, water scarcity could impact between 1.1 and 3.2 billion people, says a leaked draft of an Intergovernmental Panel on Climate Change (IPCC) report due to be published in April 2007. The report focuses on the consequences of global warming and options for adapting to them. In February 2007 the panel released a report on the scientific basis of climate change. The IPCC predicts critical water shortages in China and Australia, as well as parts of Europe and the United States. Africa and poor countries such as Bangladesh would be most affected because they were least able to cope with drought. Major cities worldwide may face a water shortage crisis by 2050 if relevant governments don't react quickly. The water shortage will mostly affect basic daily needs such as drinking, cooking, bathing and washing clothes, and the poor residents of the world's major cities in developing countries are the ones who will suffer most. "By 2050, big cities that will not have enough water available nearby include Beijing, New Delhi, Mexico City, Lagos and Tehran. China and India will be particularly hard hit unless significant new efforts are taken by their cities,". There are several principal manifestations of the water crisis. 1. Inadequate access to safe drinking water for about 884 million people. 2. Inadequate access to water for sanitation and waste disposal for 2.5 billion people. 3. Groundwater over drafting (excessive use) leading to diminished agricultural yields. 4. Overuse and pollution of water resources harming biodiversity. 5. Regional conflicts over scarce water resources sometimes resulting in warfare. Potential Hot Spots: Egypt: A coalition led by Ethiopia is challenging old agreements that allow Egypt to use more than 50 percent of the Nile’s flow. Without the river, all of Egypt would be desert. Eastern Europe: Decades of pollution have fouled the Danube, leaving down-stream countries, such as Hungary and the Republic of Moldova, scrambling to find new sources of water. Middle East: The Jordan River, racked by drought and diverted by Israeli, Syrian and the Jordanian dams, has lost 95 percent of its former flow. Former Soviet Union: The Aral sea, at one time the world’s fourth largest inland sea, has lost 75 percent of its water because of diversion programs begun in the 1960s. There are many other countries of the world that are severely impacted with regard to human health and inadequate drinking water. The following is a partial list of some of the countries with significant populations (numerical population of affected population listed) whose only consumption is of contaminated water:  Sudan: 12.3 million  Venezuela: 5.0 million  Ethiopia: 2.7 million  Tunisia: 2.1 million  Cuba :1.3 million

#### 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.

#### 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.

#### Water scarcity causes wars in asia

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>

Water stress is set to become Asia’s defining crisis of the twenty-first century, creating obstacles to continued rapid economic growth, stoking interstate tensions over shared resources, exacerbating long time territorial disputes, and imposing further hardships on the poor. Asia is home to many of the world’s great rivers and lakes, but its huge population , pollution and exploding economic and agricultural demand for water make it the most water-scare continent on a per capita basis. Many of Asia’s water sources cross national boundaries, and as less and less water is available, international tensions will rise. The poor management of river basins, environmentally unsustainable irrigation practices, an overuse of groundwater, and the contamination of water sources have all helped aggravate Asian water woes. The over exploitation of subterranean water in the large parts of the Asia has resulted in a rapidly falling groundwater saturation level- known as the water table. In the Gangetic delta, wells have tapped into naturally occurring arsenic deposits, causing millions of people in Bangladesh, and Eastern India including Jharkhand and Bihar to be exposed to high levels of poisonous arsenic in drinking water and staple agricultural products like rice. In some Asian coastal areas, the depletion of groundwater has permitted saline seawater to flow in to replace the freshwater that has been extracted. The Ganga, which is virtually synonymous with Indian civilisation, is dying. Pollution, over-extraction of water, emaciated tributaries and climatic changes are killing the mighty river, on whose fecund plains live one in 12 people of this planet. The Ganga basin makes up almost a third of India's land area and its rich soil is home to millions of people. However, indiscriminate extraction of water with modern tube wells from the river as well as its basin, coupled with the damming of its tributaries for irrigation, have seriously reduced its flow. Climate change has added to the threat. Rivers are the lifeblood of the Bangladesh economy and social life. Its cultural life is also deeply related to rivers. It is extremely unfortunately that its three main rivers, Ganges-Padma, Brahmaputra-Jamuna and Surma-Meghna are dying. As per a survey of the Bangladesh Water Development Board (BWDB), there are three hundred and ten rivers in Bangladesh. Out of these fifty-seven are border rivers, the condition of one hundred and seventy five is miserable, and sixty five are almost dead. Eighty percent of the rivers lack proper depth. The latest study reveals that one hundred and seventeen rivers are either dead or have lost navigability . Such rivers/canals include Brahamaputra, Padma, Mahananda, Gorai, Meghna, Titas, Gomati, Kushiara, Dhaleswari, Bhairab, Sitalksha, Turag etc. As per a report of BWDB, India is controlling the water of 57 rivers along with the Farakka barrage. Because of inadequate facilities for dredging, these rivers have become canals. Additionally, India has withdrawn water of several rivers including Surma, Kushiara and Mahananda. Sluice gates have been constructed on the rivers Senoa, Jamuna, Panga, Pan, Hatoori and Sui (situated near Panchagarh). Apart from the scourge of Farakka barrage, a new dam, named Tipaimukh dam, is under construction in India. Asia will continue to have the world’s largest number of people without basic or adequate access to water. The Asian water sector is plagued by serious problems, including inadequate infrastructure and poor system maintenance, financially strapped utilities, low-cost recovery, growing pollution, watershed degradation, and unsustainable groundwater extraction. Owing to leaks and system inefficiencies, a sizable portion of the water supply is lost before reaching the consumer. As water distress intensifies and global warming accelerates, local, national, and interstate disputes over water are likely to become endemic in Asia. Water, for its part, could trigger increased conflicts within and between states, and open new political disputes in Asia. Water shortages, likely to be aggravated by fast-rising use and climate change, pose a potential threat to political stability, economic modernization, public health, food security, and internal cohesion in a number of Asian states. A study of Asia’s biggest rivers-the Indus, the Brahmaputra, the Yangtze, the Yellow, and the Ganges-by different experts has found that the “ upstream snow and ice reserves of these basins-important in sustaining seasonal water availability- are likely to be affected substantially by climate change,” although the extent of impact will vary from basin to basin.

#### Nuclear war

**Campbell et al 8** (Kurt M, Assistant Secretary of State for East Asian and Pacific Affairs, Dr. Campbell served in several capacities in government, including as Deputy Assistant Secretary of Defense for Asia and the Pacific, Director on theNational Security Council Staff, previously the Chief Executive Officer and co-founder of the Center for a New American Security (CNAS), served as Director of the Aspen Strategy Group and the Chairman of the Editorial Board of the Washington Quarterly, and was the founder and Principal of StratAsia, a strategic advisory company focused on Asia, rior to co-founding CNAS, he served as Senior Vice President, Director of the International Security Program, and the Henry A. Kissinger Chair in National Security Policy at the Center for Strategic and International Studies, doctorate in International Relation Theory from Oxford, former associate professor of public policy and international relations at the John F. Kennedy School of Government and Assistant Director of the Center for Science and International Affairs at Harvard University, member of Council on Foreign Relations and  International Institute for Strategic Studies, “The Power of Balance: America in iAsia” June 2008, <http://www.cnas.org/files/documents/publications/CampbellPatelSingh_iAsia_June08.pdf>)

Asian *investment* is also at record levels. Asian countries lead the world with unprecedented infra­structure projects. With over $3 trillion in foreign currency reserves, Asian nations and businesses are starting to shape global economic activity. Indian firms are purchasing industrial giants such as Arcelor Steel, as well as iconic brands of its once-colonial ruler, such as Jaguar and Range Rover. China’s Lenovo bought IBM’s personal computer We call the transformations across the Asia-Pacific the emergence of “iAsia” to reflect the adoption by countries across Asia of fundamentally new stra­tegic approaches to their neighbors and the world. Asian nations are pursuing their interests with real power in a period of both tremendous potential and great uncertainty. iAsia is: *Integrating:* iAsia includes increasing economic interdependence and a flowering of multinational forums to deal with trade, cultural exchange, and, to some degree, security. *Innovating:* iAsia boasts the world’s most successful manufacturing and technology sectors and could start taking the lead in everything from finance to nanotech to green tech. *Investing:* Asian nations are developing infrastruc­ture and human capital at unprecedented rates. But the continent remains plagued by: Insecurity: Great-power rivalry is alive in Asia. Massive military investments along with historic suspicions and contemporary territorial and other conflicts make war in Asia plausible. Instability: From environmental degradation to violent extremism to trafficking in drugs, people, and weapons, Asian nations have much to worry about. *Inequality:* Within nations and between them, inequality in Asia is more stark than anywhere else in the world. Impoverished minorities in countries like India and China, and the gap in governance and capacity within countries, whether as back­ward as Burma or as advanced as Singapore, present unique challenges. A traditional approach to Asia will not suffice if the United States is to both protect American interests and help iAsia realize its potential and avoid pitfalls. business and the Chinese government, along with other Asian financial players, injected billions in capital to help steady U.S. investment banks such as Merrill Lynch as the American subprime mortgage collapse unfolded. Chinese investment funds regional industrialization, which in turn creates new markets for global products. Asia now accounts for over 40 percent of global consumption of steel 4 and China is consuming almost half of world’s available concrete. 5 Natural resources from soy to copper to oil are being used by China and India at astonishing rates, driving up commodity prices and setting off alarm bells in Washington and other Western capitals. Yet Asia is not a theater at peace. On average, between 15 and 50 people die every day from causes tied to conflict, and suspicions rooted in rivalry and nationalism run deep. The continent harbors every traditional and non-traditional challenge of our age: it is a cauldron of religious and ethnic tension; a source of terror and extrem­ism; an accelerating driver of the insatiable global appetite for energy; the place where the most people will suffer the adverse effects of global climate change; the primary source of nuclear proliferation; and the most likely theater on Earth for a major conventional confrontation and even a nuclear conflict. Coexisting with the optimism of iAsia are the ingredients for internal strife, non-traditional threats like terrorism, and traditional interstate conflict, which are all magnified by the risk of miscalculation or poor decision-making.

#### Water scarcity also causes Indo-Pak nuclear war.

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 Middle East 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>

The crisis over water in the Middle East is escalating. Despite existing agreements, dwindling resources – increasingly affected by pollution, agricultural/industrial initiatives and population growth – have elevated the strategic importance of water in the region. For Middle Eastern nations, many already treading the razor’s edge of conflict, water is becoming a catalyst for confrontation – an issue of national security and foreign policy as well as domestic stability. Given water’s growing ability to redefine interstate relations, the success of future efforts to address water sharing and distribution will hinge upon political and strategic approaches to this diminishing natural resource. In the Middle East, water resources are plummeting. While representing 5% of the total world population, the Middle East & North Africa (MENA) region contains only 0.9% of global water resources.1 The number of water-scarce countries in the Middle East and North Africa has risen from 3 in 1955 (Bahrain, Jordan and Kuwait) to 11 by 1990 (with the inclusion of Algeria, Israel and the Occupied Territories, Qatar, Saudi Arabia, Somalia, Tunisia, the United Arab Emirates and Yemen). Another 7 are anticipated to join the list by 2025 (Egypt, Ethiopia, Iran, Libya, Morocco, Oman and Syria). In addition to its scarcity, much of Middle Eastern water stems from three major waterways: the Tigris-Euphrates, Nile and Jordan River systems. Mutual reliance on these resources has made water a catalyst for conflict, spurring confrontations such as the 1967 War (fomented by Syria’s attempts to divert water from Israel) and the Iran-Iraq War (which erupted from disputes over water claims and availability). Recognition of water’s role as an obstacle in interstate relations has spurred numerous attempts at resolution, including diplomatic efforts (most notably the 1953-1955 U.S.-brokered Johnston negotiations) and bilateral and multilateral treaty efforts, ranging from the 1959 Agreement for the Full Utilization of Nile Waters to the 1994 Israeli-Jordanian Treaty. Along the Tigris and Euphrates Rivers, Turkey and Syria are currently approaching a massive confrontation over water resources. Relations between the two countries, strained at best, have been exacerbated since the 1980s by growing tensions over water, which have brought them to the brink of war several times. The Jordan River Basin has also emerged as a flashpoint for conflict over water. Resources in the area, suffering serious overuse as a result of pollution and population growth, have increasingly impacted interstate relations. Between Jordan and Israel, water resource issues are reaching a fever pitch. Despite the 1994 Israeli-Jordanian Treaty – which established comprehensive guidelines regulating the distribution, preservation and availability of water from the Jordan and Yarmouk Rivers – conflicts over water have risen to the forefront of relations between the two countries. Jordan, fed only by underground sources and the Jordan River, has experienced an escalating water deficit – one that is expected to reach 250 million cubic meters (nearly 1/3rd of current annual consumption) by 2010. At the same time, Israel – currently utilizing almost all available water from its National Water System (consisting of the West Bank Mountain Aquifer, the Coastal Aquifer and the Lake Kinneret Basin) – has been forced to resort to overexploitation of available resources for expanding agricultural and industrial ventures. As a result, water has become a critical bone of contention between the two countries. The historically troubled relations between Israel and the Palestinians have also been magnified by water. Mutual reliance on the West Bank Mountain Aquifer, which rests atop the demarcating border of the disputed West Bank territory (and currently provides 1/3rd of Israel’s water supply and 80% of Palestinian consumption), has created friction between the State of Israel and the Palestinian Authority.

#### Nuclear war

James A. **Russell,** Senior Lecturer, National Security Affairs, Naval Postgraduate School, ‘9 (Spring) “Strategic Stability Reconsidered: Prospects for Escalation and Nuclear War in the Middle East” IFRI, Proliferation Papers, #26, http://www.ifri.org/downloads/PP26\_Russell\_2009.pdf

Strategic stability in the region is thus undermined by various factors: (1) asymmetric interests in the bargaining framework that can introduce unpredictable behavior from actors; (2) the presence of non-state actors that introduce unpredictability into relationships between the antagonists; (3) incompatible assumptions about the structure of the deterrent relationship that makes the bargaining framework strategically unstable; (4) perceptions by Israel and the United States that its window of opportunity for military action is closing, which could prompt a preventive attack; (5) the prospect that Iran’s response to pre-emptive attacks could involve unconventional weapons, which could prompt escalation by Israel and/or the United States; (6) the lack of a communications framework to build trust and cooperation among framework participants. These systemic weaknesses in the coercive bargaining framework all suggest that escalation by any the parties could happen either on purpose or as a result of miscalculation or the pressures of wartime circumstance. Given these factors, it is disturbingly easy to imagine scenarios under which a conflict could quickly escalate in which the regional antagonists would consider the use of chemical, biological, or nuclear weapons. It would be a mistake to believe the nuclear taboo can somehow magically keep nuclear weapons from being used in the context of an unstable strategic framework. Systemic asymmetries between actors in fact suggest a certain increase in the probability of war – a war in which escalation could happen quickly and from a variety of participants. Once such a war starts, events would likely develop a momentum all their own and decision-making would consequently be shaped in unpredictable ways. The international community must take this possibility seriously, and muster every tool at its disposal to prevent such an outcome, which would be an unprecedented disaster for the peoples of the region, with substantial risk for the entire world.

#### Desal has to double every decade

Hines et al ’11

Wesley is associate professor of nuclear engineering at the Univeristy of Tennessee and performed a study analyzing the effects of desalination with six other scientists, “Advanced Instrumentation and Control Methods for Small and Medium Reactors with IRIS demonstration,” <http://www.osti.gov/bridge/servlets/purl/1015813-7MUuYb/1015813.pdf>

In Figure 1.1, countries which will face “economic water shortages” (i.e. inadequacy of¶ supply and demand) are shown. According to the market survey performed by the World¶ Resources Institute on the future growth of seawater desalination, the worldwide demand for¶ desalination is expected to double approximately every 10 years in the foreseeable future. Most¶ of the demand would arise in the Arabian Gulf and North African regions, but this is likely to¶ expand to other areas.

SMRs solve—

#### Scalability

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.

### Plan

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

### Solvency

#### Military procurement solves commercial and islanding- avoid regulation

Andres and Loudermilk 10

(Richard B. 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, Micah J, Research Associate for the Energy & Environmental Security Policy program with the Institute for National Strategic Studies at National Defense University, “Small Reactors and the Military’s Role in Securing America’s Nuclear IndustryPosted” <http://robertmayer.wordpress.com/2010/08/28/small-reactors-and-the-militarys-role-in-securing-americas-nuclear-industryposted/>, SEH)

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

#### Alternative financing cuts costs and supercharges commercialization

Fitzpatrick 11

Ryan Fitzpatrick, Senior Policy Advisor for Clean Energy at Third Way, Josh Freed, Vice President for Clean Energy at Third Way, and Mieke Eoyan, Director for National Security at Third Way, 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**.

#### DoD key

Glen Butler, Lt. Col., 2011, Not Green Enough, [www.mca-marines.org/gazette/not-green-enough](http://www.mca-marines.org/gazette/not-green-enough)

SMRs have relatively low plant cost, can replace aging fossil plants, and do not emit greenhouse gasses. Some are as small as a “hot tub” and can be stored underground, dramatically increasing safety and security from terrorist threats.25 Encouragingly, in fiscal year 2010 (FY10) the DoE allocated $0 to the U.S. SMR Program; in FY11, they’ve requested $38.9 million. This funding is to support two main activities—public/private partnerships to advance SMR designs and research and development and demonstrations. According to the DoE’s website, one of the planned program accomplishments for FY11 is to “collaborate with the Department of Defense (DoD) . . . to assess the feasibility of SMR designs for energy resources at DoD installations.”26 The Marine Corps should vigorously seek the opportunity to be a DoD entity providing one platform for this feasibility assessment.27 Fourth, SMR technology offers the Marine Corps another unique means to lead from the front—not just of the other Services but also of the Nation, and even the world.28 This potential Pete Ellis moment should be seized. There are simple steps we could take, and others stand ready to lead if we are not.30 But the temptation to “wait and see” and “let the others do it; then we’ll adopt it” mentality is not always best. Energy security demands boldness, not timidity. To be fair, nuclear technology comes with challenges, of course, and with questions that have been kicked around for decades. An April 1990 Popular Science article asked, “Next Generation Nuclear Reactors—Dare we build them?” and included some of the same verbiage heard in similar discussions today.31 Compliance with National Environment Policy Act requirements necessitates lengthy and detailed preaction analyses, critical community support must be earned, and disposal challenges remain. Still, none of these hurdles are insurmountable. Yet despite the advances in safety, security, and efficiency in recent years, nuclear in the energy equation remains the new “n-word” for most military circles. And despite the fact that the FY10 National Defense Authorization Act called on the DoD to “conduct a study [of] the feasibility of nuclear plants on military installations,” the Office of the Secretary of Defense has yet to fund the study. Fifth, the cumbersome, bureaucratic certification process of the Nuclear Regulatory Commission (NRC), often enough to scare away potential entrepreneurs and investors, is not necessarily a roadblock to success. The NRC is “responsible for licensing and regulating the operation of commercial nuclear power plants in the United States.” Military installations offer unique platforms that could likely bypass an extended certification process. With established expertise and a long safety record in nuclear reactor certification, operations, training, and maintenance, the Naval Nuclear Propulsion Program comprises the civilian and military personnel who: . . . design, build, operate, maintain, and manage the nuclear-powered ships and the many facilities that support the U.S. nuclear-powered naval fleet.”34 Bypassing the NRC and initiating SMR experimentation under ADM Hyman Rickover’s legacy umbrella of naval reactors could shorten the process to a reasonable level for Marine and naval installations.35

#### DOD key- prevents unfavorable lock-in

Andres and Breetz 11

(Richard B. Andres is Professor of ¶ national Security Strategy at the ¶ national War College and a Senior fellow and energy and environmental ¶ Security and Policy Chair in the Center ¶ for Strategic research, institute for national Strategic Studies, at the national Defense University. Hanna L. Breetz is a doctoral candidate in the Department of Political Science at the Massachusetts institute of technology, “Small Nuclear Reactors ¶ for Military Installations:¶ Capabilities, Costs, and ¶ Technological Implications” Institute for National Strategic Studies, <http://www.ndu.edu/press/lib/pdf/strforum/sf-262.pdf>, SEH)

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.

#### They have the personnel

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)

Section 332 of the FY2010 National Defense Authorization Act (NDAA), “Extension and Expansion of Reporting Requirements Regarding Department of Defense Energy Efficiency Programs,” requires the Secretary of Defense to evaluate the cost and feasibility of a policy that would require new power generation projects established on installations to be able to provide power for military operations in the event of a commercial grid outage.28 A potential solution to meet this national security requirement, as well as the critical needs of nearby towns, is for DoD to evaluate SMRs as a possible source for safe and secure electricity. Military facilities depend on reliable sources of energy to operate, train, and support national security missions. The power demand for most military facilities is not very high, and could easily be met by a SMR. Table 1 provides the itemized description of the annual energy requirements in megawatt of electricity (MWe) required for the three hundred seventy four DoD installations.29 DoD History with SMRs The concept of small reactors for electrical power generation is not new. In fact, the DoD built and operated small reactors for applications on land and at sea. The U.S. Army operated eight nuclear power plants from 1954 to 1977. Six out of the eight reactors built by the Army produced operationally useful power for an extended period, including the first nuclear reactor to be connected and provide electricity to the commercial grid. 30 The Army program that built and operated compact nuclear reactors was ended after 1966, not because of any safety issues, but strictly as a result of funding cuts in military long range research and development programs. In essence, it was determined that the program costs could only be justified if there was a unique DoD specific requirement. At the time there were none.31 Although it has been many years since these Army reactors were operational, the independent source of energy they provided at the time is exactly what is needed again to serve as a secure source of energy today. Many of the nuclear power plant designs used by the Army were based on United States Naval reactors. Although the Army stopped developing SMRs, the Navy as well as the private sector has continued to research, develop, and implement improved designs to improve the safety and efficiency of these alternative energy sources. The U.S. Navy nuclear program developed twenty seven different power plant systems and almost all of them have been based on a light water reactor design.32 This design focus can be attributed to the inherent safety and the ability of this design to handle the pitch and roll climate expected on a ship at sea. To date, the U. S Navy operated five hundred twenty six reactor cores in two hundred nineteen nuclear powered ships, accumulated the equivalent of over six thousand two hundred reactor years of operation and safely steamed one hundred forty nine million miles. The U.S. Navy has never experienced a reactor accident.33 All of the modern Navy reactors are design to use fuel that is enriched to ninety three percent Uranium 235 (U235) versus the approximate three percent U235 used in commercial light water reactors. The use of highly enriched U235 in Navy vessels has two primary benefits, long core lives and small reactor cores.34 The power generation capability for naval reactors ranges from two hundred MWe (megawatts of electricity) for submarines to five hundred MWe for an aircraft carrier. A Naval reactor can expect to operate for at least ten years before refueling and the core has a fifty year operational life for a carrier or thirty to forty years for a submarine.35 As an example, the world’s first nuclear carrier, the USS Enterprise, which is still operating, celebrated fifty years of operations in 2011.36 The Navy nuclear program has set a precedent for safely harnessing the energy associated with the nuclear fission reaction. In addition, the Navy collaborates with the private sector to build their reactors and then uses government trained personnel to serve as operators. Implementing the use of SMRs as a secure source of energy for our critical military facilities will leverage this knowledge and experience.

# 2AC

## Case

### at: empirics

#### Thousands of years of data prove

Glecik 5/29/9

<http://seedmagazine.com/content/article/the_truth_about_water_wars/> Peter Gleick is co-founder and president of the Pacific Institute in Oakland, California, and a member of the World Economic Forum Global Agenda Council on Water Security and the UN’s Expert Group on Policy Relevance of the World Water Assessment Program. He is editor of the biennial book The World’s Water and has recently begun blogging at Water By the Numbers.

Far more important, and far easier to answer, is the question: Is there any connection between fresh water and conflict, including violent conflict? And the answer has to be an unambiguous “yes.” History going back 5,000 years is rife with examples where water has been a goal of violence, a target or tool of conflict, or a source of disputes and political strife. Our Water Conflict Chronology, at worldwater.org, lists hundreds of these examples. And if there is a strong connection between water and conflicts, two new questions come up: Are the risks of these conflicts growing, and how can we reduce them? I think the answer to the first is, yes, the risks of water-related conflicts appears to be growing.

### 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.

## Debt Ceiling

Counterplan links just as much

### Every 2AC

Deal inevitable- capital only shapes it

Scottsman 1-2

“US Back from Cliff Edge-But Still Far From a Deal,” lexis

Congress leaders made clear that yesterday's deal marks only a pause in the heated talks over how best to sort out America's deficit problem.¶ A two-month extension has been granted to swingeing spending cuts now due to come into force. The lawmakers will draw breath before beginning again.¶ The Republicans are intending to seek spending cuts in¶ exchange for letting the Treasury borrow above the current debt limit of $16.4 trillion (£10tn).¶ For his part, Barack Obama made clear he will not countenance piling all the burden of deficit reduction on spending cuts to government programmes such as Medicare.¶ His statement yesterday - in which he bluntly noted that he will be president for another four years - suggested that he intends to spend some of the¶ political capital his election victory two months ago bought him.¶ Given the stakes, and the mutual self-destruction that awaits a failure to act, another last-minute fudge, similar to yesterday's deal, seems likely.

#### Obama won’t negotiate on cliff

Buzzfeed 1-1

“I won’t Negotiate over the Debt Ceiling,” <http://www.buzzfeed.com/zekejmiller/obama-i-wont-negotiate-over-the-debt-ceiling>

President Barack Obama reiterated his pledge not to negotiate over the nation's borrowing limit Tuesday night, as he marked the passage of a bill to avert the fiscal cliff.¶ Speaking from the White House briefing room 20 minutes after the House of Representatives passed the bill — and minutes before his own return to a vacation in his native Hawaii — Obama offered Republicans brief, tough talk.¶ "While I will negotiate over many things, I will not have another debate with this Congress over whether they should pay the bills for what they've racked up," Obama said. "We can't not pay bills that we've already incurred."¶ The debt ceiling one was half of a doctrine Obama laid out late Tuesday, requiring that all deficit reduction measures include revenue increases.¶ With looming fights over the debt limit, dealing with the rest of the mandatory spending cuts, and funding the federal government, Obama said he fully intends to take up measures to bring down the deficit — which has topped $1 trillion annually for four years.¶ "The fact is, the deficit is still too high," Obama said, repeating his openness to examining ways to strengthen entitlement programs like Medicare. “But the deficit needs to be reduced in a way that’s balanced," he added, saying “further reforms to our tax code" must accompany spending cuts.¶ "Today’s agreement enshrines, I think, a principle into law that will remain in place as long as I am President," Obama said. "The deficit needs to be reduced in a way that's balanced. Everyone pays their fair share. Everyone does their part. That's how our economy works best. That's how we grow."¶ Obama bemoaned his repeated inability to strike a "grand bargain" with House Republicans.¶ “That failure comes with a cost,” Obama said, warning of another bitter fight over fiscal issues that have dominated the past two months and will do the same for the next.¶ But in a celebratory move, Obama also crossed off an item on his post-election check-list, saying he fulfilled his campaign pledge to raise taxes on the rich while protecting tax breaks for the middle class.¶ "A central premise of my campaign for president was to change the tax code...Tonight we’ve done that," Obama said.¶ Obama thanked congressional leaders and Vice President Joe Biden for negotiating the agreement and getting it through Congress, saying "everybody worked very hard on this."¶ After his brief statement, Obama greeted aides outside the Oval Office, before quickly walking to Marine One for the first leg of his trip back to Hawaii to continue his vacation.

#### Plan popular in Congress- Only 1 vote against it and both parties cosponsor

Pendidikan ‘11

Cinta writes for the Love and Like Education Blog, “Sanders is the Sole Vote Against Small Modular Reactor Research,” <http://loveandlikeeducation.blogspot.com/2011/08/bernie-sanders-and-small-modular.html>

Sanders is Sole Vote Against Small Modular Reactor Research¶ Bernie Sanders and Small Modular Reactors¶ Senator Bernie Sanders often speaks about his opposition to Vermont Yankee as having something to do with the age of the plant, the fact it is owned by Entergy, or his "state's rights" stance about regulating nuclear power plants.¶ Recently, however, Sanders made it clear that he is against nuclear power in any form and is proud of that opinion. On Senator Sanders website, he featured the fact that he was the only vote against "a pair of measures that would promote the development of small modular reactors."¶ One of these measures was the Nuclear Power Act S512. This act would authorize the Secretary of Energy to start a cost-shared program for development of small modular reactors (SMRs).¶ This act had strong bi-partisan support, being sponsored by 3 Republican and 4 Democratic Senators. The act requires research and development funds for SMRs. The Act is still in process, and does not have a firm dollar amount attached, but the dollar amount is likely to be small (in government terms, at least.). Current estimates are $100 million per fiscal year for four years, starting next year.¶ The act also requires that industry cost-share the expense. If industry doesn't think it is worth spending money on the research, the research will not receive government funding either.¶ As a background to the probable cost of this Act, we should note that President Obama requested $4.8 billion dollars for Department of Energy research, of which $3.2 billion is allocated for renewable energy and energy efficiency research. (This number has changed with the debt deal, but new numbers are not available at this time.)¶ Small Modular Reactors for The Future¶ Sander's opposition to this Nuclear Power Act will hurt America's chances to develop an important new exportable technology. Outside of Europe, the nuclear renaissance remains in full swing, with reactors being ordered and built in Arabia, China, India and Southeast Asia. Developing a strong set of SMR designs would be America's best chance to re-entering the world market for nuclear power.¶ SMRs are modular (assembled in a factory and delivered to the site), small (50 to 225 MW) and have many safety features, such as passive cooling. SMRs are expected to have a huge international market. They suitable for many places that do not have the population density or money for the current crop of huge reactors (1200 MW, built on site at great expense). SMRs would make nuclear power affordable and salable many places.¶ Westinghouse and Babcock & Wilcox have invested significant amounts of their own money in developing these products. The NRC is also active in assessing preliminary designs. At another Senate committee meeting on SMRs, Commissioner Magwood of the NRC said that he does not expect decisions made by the NRC to be the critical factor in the success or failure of SMRs. Magwood noted that SMRs have passive safety features and large water inventories; these would be considered during license review.¶ America Fallen Behind¶ America has fallen far behind the rest of the world in most nuclear technologies. Pressurized Water Reactors (PWRs) and Boiling Water Reactors (BWRs) were developed in this country. They are being sold all over the world, but not by United States companies. We're out of the running. Other countries licensed and improved our original technologies. Companies from France, Korea, Russia and China compete to build large reactors in China, Arabia, and Southeast Asia.¶ Three American companies have put millions of dollars into the development of SMRs: Westinghouse, Babcock & Wilcox, and NuScale (a small start-up). Many people in the nuclear industry feel that the race to develop the first successful SMR is a truly high-stakes race, being fought at the level of nationwide efforts. Luckily, SMR development has bi-partisan support, and Mr. Sanders was alone in his opposition to supporting American industry efforts to develop these plants.¶ Should Government Be Involved?¶ Of course, one can make a case that the government should get out of the energy research business altogether. If Senator Sanders wished to save tax dollars by cutting all energy-research programs, he might have a valid case. However, if the government does plan to spend money on energy research, cost-sharing with industry on a new nuclear technology is certainly a far better use of funds than many of the projects in the swollen DOE renewable budget.

#### Winners win - even controversial policies boost Obama’s capital

Singer 9 (Juris Doctorate candidate at Berkeley Law, Jonathon, “By Expending Capital, Obama Grows His Capital,” 3/3/2009, <http://www.mydd.com/story/2009/3/3/191825/0428>)

Despite the country's struggling economy and vocal opposition to some of his policies, President Obama's favorability rating is at an all-time high. Two-thirds feel hopeful about his leadership and six in 10 approve of the job he's doing in the White House. "What is amazing here is how much political capital Obama has spent in the first six weeks," said Democratic pollster Peter D. Hart, who conducted this survey with Republican pollster Bill McInturff. "And against that, he stands at the end of this six weeks with as much or more capital in the bank." Peter Hart gets at a key point. Some believe that political capital is finite, that it can be used up. To an extent that's true. But it's important to note, too, that political capital can be regenerated -- and, specifically, that when a President expends a great deal of capital on a measure that was difficult to enact and then succeeds, he can build up more capital. Indeed, that appears to be what is happening with Barack Obama, who went to the mat to pass the stimulus package out of the gate, got it passed despite near-unanimous opposition of the Republicans on Capitol Hill, and is being rewarded by the American public as a result.

#### EPA appointment thumps

Clean Air Report 1/3/2013

(Clean Air Report¶ January 3, 2013¶ JACKSON RESIGNATION MAY TRIGGER TOUGH SENATE FIGHT OVER NEXT EPA CHIEF¶ SECTION: Vol. 24 No. 1)

Focus will now shift to candidates to replace Jackson, a list that is also said to include California Air Resources Board Chairwoman Mary Nichols and former Pennsylvania environment secretary Kathleen McGinty.¶ But given expected gridlock in the 113th Congress, one energy expert has said that the next nominee for EPA Administrator "will have a hellish confirmation process," regardless of their background. During Jackson's tenure, House Republicans have offered strong opposition to the agency's regulatory agenda, raising concerns about the cost of EPA rules and claiming that the agency is waging a regulatory "war" on the coal sector.

#### Obama capital fails

Rubin 12-31

Jennifer is the conservative commentator for the Washington Post and a “this Week” panelist, “Obama Just makes it worse,” <http://www.washingtonpost.com/blogs/right-turn/wp/2012/12/31/obama-just-makes-it-worse/>

¶ Let’s get this straight: The president can’t make a deal with the speaker of the House on the fiscal cliff. He then punts to the Senate Majority and Minority leaders, but alas Sen. Harry Reid (D-Nev.) can’t even come up with a counteroffer. Reid then punts to Vice President Joe Biden, who presumably is more skilled than the president at this sort of thing. One is tempted to ask what President Obama really does all day.¶ ¶ President Obama’s absence might contribute to deal-making (Jason Reed/Reuters)¶ ¶ The answer is neatly summed up by Yuval Levin:¶ ¶ The president’s appearance on Meet the Press [Sunday] was downright pathetic in this regard, as have been his various press statements in the past few days. This sort of preening and lecturing from a politician who has basically just failed to do his job is bizarre.¶ ¶ ¶ ¶ Mr. President, you’re going to sign whatever congress ultimately passes, assuming something passes. Sometimes that’s just how it is for a president, any president. Can we not just accept that? And if the fiscal cliff is followed immediately by the next round of debt-ceiling talks, might we just start those with House-Senate negotiations and have them pass a bill and send it down the street like they’re supposed to, rather than go through weeks of pointless private White House drama and public presidential hectoring about how reasonable Barack Obama is compared to everybody else?¶ ¶ The only quibble I would have is that this conduct is hardly “bizarre.” It’s typical of the narcissistic behavior that this president has exhibited these past four years. ¶ ¶ It was telling, as a fellow conservative mentioned to me on Sunday, that in Obama’s Meet the Press interview he declared that the Newtown massacre was the worst day of his presidency. The conservative exclaimed: “It had nothing to do with Obama or his presidency!” She was right, of course. It was the worst day ever for those parents and that community, but Obama’s inserting himself in others’ tragedy reminds us that it is always about Obama — except when it comes to failure or scandal. (For the real worst day of his presidency there are many contenders: Fumbling the grand bargain in 2011; surprising the Israeli prime minister with his “1967 borders” speech; the 2010 election shellacking; the death of four Americans due to his administration’s negligence in Benghazi; etc.).¶ ¶ Bad results are never Obama’s fault; bad things are caused by other people. He is there to remind us he feels more deeply, is more reasonable and is more high minded than the rest of us.¶ ¶ Meanwhile, if we use a mortal standard for rating him and his presidency – say, competence — he doesn’t get a passing grade. At this point every Clinton, Bush or Reagan White House veteran could figure out where the deal is. But if we posit that Obama is anything but dim, then we must conclude Obama either perpetually assumes that his aura will magically melt opposition (his favorite method being a campaign bustrip that only annoys his opponents) or that he never intends to make true compromises (in the case of the fiscal cliff, real entitlement reform). Either way, the result is never a grand or mini-deal. We get no deal and Obama’s scorn for political opponents who won’t take “yes” for an answer. Sanctimony is the operating emotion for this White House.¶ ¶ We see the exact same process now playing out that we saw in the 2011 debt-ceiling deal, aptly documented in Bob Woodward’s The Price of Politics. In the end, grown-ups (not including the president) have to do the hard work.¶ ¶ Obama wanted revenue on the table. He got revenue. He then wanted a huge amount of revenue, higher than any serious bipartisan commission or group to date has proposed, and nothing on the entitlement front. He can say as many times as he likes that he met the GOP halfway, but it doesn’t make it so. (If you doubt it, think how much more favorable to the GOP would be the president’s own Simpson-Bowles debt commission proposal.) If Bill Clinton were president we could have had a dozen deals by now on everything from Social Security to tax reform to defense spending. He both wanted to be a maker-of-deals and had the skills to make it happen. Neither can be said of Obama.¶ ¶ The bad news in this is that the president is likely to behave no better in the debt ceiling fight. He is bound and determined, it seems, to avoid making the hard calls on fiscal sobriety. He is not in the business of disappointing the left by containing the size of government. He perhaps has convinced himself that entitlement reform isn’t so urgent, something to be fobbed off on the next Oval Office occupant.¶ ¶ Sen. Jeff Sessions (R-Ala.), the ranking member on the Senate Budget Committee, is onto something in demanding a halt to this Lucy-and-the-football routine. In a written statement last night he suggested:¶ ¶ “The biggest obstacle we face is that President Obama and Majority Leader Reid continue to insist on new taxes that will be used to fund more new spending, not for meaningful deficit reduction. The result is nearly $9 trillion in new debt accumulation over the next decade, which represents virtually no change from current projections. By now, it should be clear to all that secret negotiations are not working. In the new year, the Senate must return to the difficult but necessary process of open, public legislative work that this chamber was conceived to carry out.”¶ ¶ That may not happen in this round. But come the fight on the debt ceiling it seems that is the appropriate avenue for the GOP. Pass a debt ceiling bill complete with entitlement and tax reform. Send it to the Senate and insist Reid and his fellow Democrats do their work. No more closed-door haggling. Pass a bill, send it back to the House and then fight it out. Meanwhile, President Obama can go play golf, which come to think of it might be a positive contribution to the process.

**No recession impact**

Coleman ‘3

(Glenn, writer for Money Magazine, CNN, “Peter Lynch: Why he's buying now,” 1-24, http://money.cnn.com/2003/01/23/funds/lynch/)

Recessions are scary things, and the obvious worries about jobs and bonuses and bills and bankruptcies-- the background noise that keeps you awake at night, Lynch calls it--often mute an important fact: **The U.S. economy has seen 10 recessions since 1945, and it has emerged from nine of them stronger than before**. Of course, it's not a fact yet that we'll pull ourselves No. 10 in better shape.

**Recession inevitable**

**The Week 11-7**

“Obama’s Next Challenge: Can he Avoid the Fiscal Cliff?” <http://theweek.com/article/index/236037/obamas-next-challenge-can-he-avoid-the-fiscal-cliff>

The fiscal cliff isn't even Obama's biggest problem: "The fiscal cliff may actually be the easiest one" for Obama to deal with, says Ed Yardeni at Dr. Ed's Blog. That just involves getting Republicans and Democrats to make a deal, and neither wants to go over the precipice. Resolving "the **conflicts between Israel and Iran, China and Japan, and** the already warring factions in **Syria could be much more challenging." If just one of these** crises **worsens, the global recovery could crumble.**

## Microgrid

### Microgrid 2AC

#### Perm- do both

#### Perm- do the counterplan

#### Doesn’t solve China- nuclear exports are key to checking Chinese hegemony- impact is Asian war, South China sea conflict, and US-China war

#### Doesn’t solve grid- intermittency and storage problems means they can’t solve base blackouts- that’s Andrews and Breetz

#### Microgrids fail

Daniel Sater 11, Research Fellow at Global Green USA’s Security and Sustainability Office, “Military Energy Security: Current Efforts and Future Solutions”, August, <http://globalgreen.org/docs/publication-185-1.pdf>

Cybersecurity remains one of the leading challenges impeding the development of a smart grid. In January 2011, the GAO published a report on the progress being made on cybersecurity as it related to smart grids71. Unfortunately, the report did not specifically address microgrids. The GAO found six challenges, however, to the development of a smart grid. The DOD is nonetheless well suited to handle the challenges listed by the GAO and the confinement of microgrids to military installations should mitigate many cybersecurity risks. The challenges listed by the GAO and the advantages of military microgrids for cybersecurity appear below. Challenge 1: Aspects of the regulatory environment may make it difficult to ensure smart grid systems’ cybersecurity. The federal government and state governments regulate electricity production and distribution. Having multiple entities produce regulations can lead to conflicting rules and thus confusion. Microgrids on military installations should avoid many of the regulatory issues the GAO found with the smart grid. The confinement of microgrids to military bases means that only the DOD will have regulatory control over them. There is precedent for states to exempt military installations from state regulations. According to a different GAO report, states often excluded military installations from their renewable energy-production goals.72 Furthermore, it is unlikely that any state government would want to get into the politically untenable battle with the Pentagon over issuing competing regulations governing military bases. Challenge 2: Utilities are focusing on regulatory compliance instead of comprehensive security. Microgrid cybersecurity will benefit from having the same entity, the DOD, issue the microgrid regulations and own the microgrids. Utilities have little incentive to invest in security measures past the bare minimum necessary for regulatory compliance. However, unlike a utility, the DOD will suffer in the event of a cybersecurity failure and thus has incentives to pursue comprehensive security. Challenge 3: The electric industry does not have an effective mechanism for sharing information on cybersecurity. Different utility companies across different states do not have a central authority analogous to that which military bases have in the Pentagon. Though there will certainly be bureaucracy, the DOD has more capacity to share information about cybersecurity and cyber-attacks than utilities. Challenge 4: Consumers are not adequately informed about the benefits, costs, and risks associated with smart grid systems. The DOD can take steps to inform all of its employees about microgrids in ways that may not be available to utilities to inform their customers. The DOD could require short classes on the benefits and risks of microgrids for all its employees and more rigorous education for its base commanders and others making decisions about grid implementation. A utility company cannot require its customers to take a class. A utility’s best option for educating its customers would be to send out information packets with monthly bills and hope that consumers read them. Challenge 5: There is a lack of security features being built into certain smart grid systems. Given the importance of the DOD’s mission and the potentially catastrophic repercussions of lax cybersecurity, the Pentagon will not take the security of its microgrids lightly, especially with the recent publication of the “Department of Defense Strategy for Operating in Cyberspace.”73 Challenge 6: The electricity industry does not have metrics for evaluating cybersecurity. The lack of evaluation metrics is a serious problem, but the DOD could instruct USCYBERCOM to create a specific set of metrics for microgrid development.

#### More ev—DOD study

S.B. Van Broekhoven et al june ‘12 N. Judson S.V.T. Nguyen W.D. Ross, “Microgrid Study:

Energy Security for DoD Installations,” AM

Cyber security concerns are a significant detriment to microgrid development. The DoD should

develop/certify a set of DIACAP-approved devices that can be used across the services for energy

management systems.

#### That outweighs everything

Wilhusen and Trimble 12

(Statement of Gregory C. Wilshusen, Director Information Security Issues David C. Trimble, Director Natural Resources and Environment, “Challenges in Securing the Modernized Electricity Grid” February 28, 2012, GAO Testimony Before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives, GAO-12-507T)

The threats to systems supporting critical infrastructures are evolving and growing. In a February 2011 testimony, the Director of National Intelligence noted that there had been a dramatic increase in cyber activity targeting U.S. computers and systems in the previous year, including a more than tripling of the volume of malicious software since 2009. Varying types of threats from numerous sources can adversely affect computers, software, networks, organizations, entire industries, and the Internet itself. These include both unintentional and intentional threats, and may come in the form of targeted or untargeted attacks from criminal groups, hackers, disgruntled employees, hostile nations, or terrorists. The interconnectivity between information systems, the Internet, and other infrastructures can amplify the impact of these threats, potentially affecting the operations of critical infrastructures, the security of sensitive information, and the flow of commerce. Moreover, the smart grid’s reliance on IT systems and networks exposes the electric grid to potential and known cybersecurity vulnerabilities, which could be exploited by attackers.

#### This is the key solvency deficit question

Bodenheimer 12

(David, partner in the law firm of Crowell & Moring LLP in the DC office where he heads the Homeland Security Practice and specializes in Government Contracts, False Claims Act, Privacy, and Cybersecurity, “Cyberwarfare in the Stuxnet Age Can Cannonball Law Keep Pace With the Digital Battlefield?” Winter 2012, The SciTech Lawyer, Volume 8, Number 3)

Now that cyberweapons have been field-tested, virtually no one expects Stuxnet to be the last attack. As Dr. Lewis testified, “[c]yber attack will be like the airplane—within a few years, no self respecting military will be without this capability.”25 Major US adversaries are developing the capacity for cyberattacks on critical infrastructure: One is the threat of cyber attack. Many nation states, like Russia, China, North Korea, and Iran, have offensive cyber attack capabilities, while terrorist groups like Hezbolla and al Qaeda continue to work to develop capabilities to attack and destroy critical infrastructure like the electric grid through cyber attacks.26 Indeed, some US offcials have predicted that major cyberattacks are “nearly a certainty,” given “the promised retaliation against the U.S. for the Stuxnet work that destroyed Iranian nuclear centrifuges.”27 The distributed denial of service (DDOS) attacks on Estonia and Georgia during disputes with Russia and the coordinated hacking attacks on Google to access accounts of Chinese dissidents provide realworld examples that the age of cyberwar has already arrived. Given this new reality, the private sector needs to gear up for the risks that come with a cyberwar world.

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

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

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

#### 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.

#### Renewables don’t solve- DOD cheats

Sater 11

(Daniel, Research Fellow at Global Green USA’s Security and Sustainability Office in ¶ Washington, DC in the summer of 2011. He is a graduate student at the Frank Batten School of ¶ Leadership and Public Policy at the University of Virginia. Daniel holds a BA in Foreign Affairs ¶ from UVA and will receive his Master of Public Policy degree in May 2012. “Military Energy Security: Current Efforts and Future Solutions” <http://www.globalgreen.org/docs/publication-185-1.pdf>, SEH)

In 2008, the DOD acquired 2.9% of its electricity from renewable sources, falling just below the ¶ goal but surpassed the 3% goal in 2009 with 3.6% of its electricity coming from renewable ¶ sources.¶ 36¶ However, these numbers are deceiving. The DOD was only able to surpass this goal ¶ with the purchase of Renewable Energy Certificates. ¶ When a renewable energy source creates electricity, it creates two commodities: the electricity ¶ itself and a Renewable Energy Certificate. The utility (or whomever owns the energy source) can ¶ sell the electricity and the certificate together in a process called bundling or separately, known ¶ as unbundled energy. For example, if a military base has a solar array that produces 1MW of ¶ electricity, it also creates a certificate for 1MW of electricity. If the base sells the electricity it ¶ creates back to the utility, but keeps the certificate, the base can count the 1MW credit towards ¶ the renewable energy goal. If the base uses the electricity and keeps the certificate, it can count ¶ 2MW towards the goal. Finally, if the base sells the electricity and the certificate, it cannot count ¶ either towards its renewable energy goal. A base can also buy unbundled electricity (the credit or the actual electricity) or bundled electricity from a utility. The problem with only buying the ¶ certificate is that the base still must purchase electricity to power the installation. In meeting its renewable energy goal, the DOD does not distinguish between buying Renewable ¶ Energy Certificates and the actual use of renewable energy. The Army with 2.1% and Navy with ¶ 0.6% were well below the 3% goal, and the DOD was only able to surpass the goal because the ¶ Air Force consumed 5.8% of its electricity from renewable sources, but this figure comes mainly ¶ from the purchase of credits.¶ 38¶ The DOD’s FY 2009 Annual Energy Management Report does ¶ not specify what percentage of the energy use came from certificates but does make special ¶ mention of the Air Force’s purchase of certificates. However, the GAO reports that 90% of the ¶ DOD’s renewable energy use came from the purchase of certificates in 2007.¶ 39

## REC Procurement CP

### DA Inevitable

#### Increase in alt financing of renewable energy is inevitable

GAO 12

(United States Government Accountability Office, “RENEWABLE ¶ ENERGY PROJECT ¶ FINANCING¶ Improved Guidance ¶ and Information ¶ Sharing Needed for ¶ DOD Project-Level ¶ Officials” <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518>)

Moving forward, DOD plans to expand its use of alternative-financing ¶ approaches for renewable energy projects. In its Strategic Management ¶ Plan for fiscal years 2012 and 2013, DOD established a goal to increase ¶ operational and installation energy efficiency to reduce costs and improve ¶ energy security, among other benefits.¶ One of the key initiatives within ¶ this goal is to expand the use of alternative financing for energy efficiency ¶ and renewable energy projects by 15 percent, as measured by the dollar value of awarded contracts, by the end of fiscal year 2015. According to ¶ DOD’s annual energy management report for fiscal year 2010, DOD ¶ awarded $323 million in contracts for energy efficiency and renewable ¶ energy projects that were financed with Energy Savings Performance ¶ Contracts and Utility Energy Service Contracts. Thus, DOD would need ¶ to award nearly $50 million more in contracts, or a total of about $372 ¶ million, to meet this goal. An official from the Office of the Deputy Under ¶ Secretary of Defense (Installations and Environment) said that the Office ¶ of the Secretary of Defense plans to measure progress toward the goal ¶ annually based on the military services’ submissions for DOD’s Annual ¶ Energy Management Report. At the time of our review, the Office of the ¶ Secretary of Defense had not provided information to the military services ¶ about the goal, but an official said that the office is establishing a working ¶ group to assist the services in initiating and completing projects financed ¶ with alternative-financing approaches through improved collaboration and ¶ communication among stakeholders and sharing best practices.

### Nuclear not REC

#### Nuclear isn’t eligible for RECs

Andrews 11/27/12

(Anthony, Specialist in Energy and Defense Policy, “DOD Purchase of Renewable Energy Credits ¶ Under the National Defense Authorization ¶ Act of 2012” http://www.fas.org/sgp/crs/natsec/R42840.pdf)

A REC is a tradable, non-tangible energy commodity in the United States that represents proof that one megawatthour (MWh) of electricity was generated from an eligible renewable energy (solar, wind, biomass, ocean, geothermal, ¶ municipal solid waste, “new” hydroelectric generation) resource. Its purchase conveys the right to claim the ¶ environmental benefit associated with renewable generated electricity. A REC identifies the characteristics of the ¶ particular generator such as location, the emissions output of the generator, the fuel the generator used to produce ¶ the electricity, and the date the generator went into service (also known as its pedigree). The marketplace may sell ¶ RECs separately from the megawatt-hours of generated electricity with which they are associated.

## AT Procure CP

### Perm

#### Plan mandate is for DoD to obtain or get SMR electricity—the CP is a way to implement this

SCOTUS 3, Scheidler v. National Organization for Women, Inc. - 537 U.S. 393 (2003), <http://supreme.justia.com/cases/federal/us/537/393/case.html>

(a) Petitioners did not commit extortion within the Hobbs Act's meaning because they did not "obtain" property from respondents. Both of the sources Congress used as models in formulating the Hobbs Act-the New York Penal Code and the Field Code, a 19th-century model penal code-defined extortion as, inter alia, the "obtaining" of property from another. This Court has recognized that New York's "obtaining" requirement entailed both a deprivation and acquisition of property, see United States v. Enmons, 410 U. S. 396, 406, n. 16, and has construed the Hobbs Act provision at issue to require both features, see, e. g., id., at 400. It is undisputed that petitioners interfered with, disrupted, and in some instances completely deprived respondents of their ability to exercise their property rights. Likewise, petitioners' counsel has acknowledged that aspects of his clients' conduct were criminal. But even when their acts of interference and disruption achieved their ultimate goal of shutting down an abortion clinic, such acts did not constitute extortion because petitioners did not "obtain" respondents' property. Petitioners may have deprived or sought to deprive respondents of their alleged property right of exclusive control of their business assets, but they did not acquire any such property. They neither pursued nor received "something of value from" respondents that they could exercise, transfer, or sell. United States v. Nardello, 393 U. S. 286, 290. To conclude that their actions constituted extortion would effectively discard the statutory "obtaining" requirement and eliminate the recognized distinction between extortion and the separate crime of coercion. The latter crime, which more accurately describes the nature of petitioners' actions, involves the use of force or threat of force to restrict another's freedom of action. It was clearly defined in the New York Penal Code as a separate, and lesser, offense than extortion when Congress turned to New York law in drafting the Hobbs Act. Congress' decision to include extortion as a violation of the Hobbs Act and omit coercion is significant here, as is the fact that the AntiRacketeering Act, the predecessor to the Hobbs Act, contained sections explicitly prohibiting both. The Hobbs Act omission is particularly significant because a paramount congressional concern in drafting that Act was to be clear about what conduct was prohibited, United States v. Culbert, 435 U. S. 371, 378, and to carefully define the Act's key terms, including "extortion," id., at 373. Thus, while coercion and extortion overlap to the extent that extortion necessarily involves the use of coercive conduct to obtain property, there has been and continues to be a recognized difference between these two crimes. Because the Hobbs Act is a criminal statute, it must be strictly construed, and any ambiguity must be resolved in favor of lenity. Enmons, supra, at 411. Culbert, supra, at 373, distinguished. If the distinction between extortion and coercion, which controls these cases, is to be abandoned, such a significant expansion of the law's coverage must come from Congress, not from the courts. pp.400-409.

#### Alt financing can buy the reactor!

GAO, April 2012, RENEWABLE ENERGY PROJECT FINANCING: Improved Guidance and Information Sharing Needed for DOD Project-Level Officials, http://gao.gov/assets/590/589883.pdf

Alternative-financing approaches

[Note: Large chart with host of mechanisms that are included in alternative financing (one of which is power purchasing), the last of which is:]

Lease-to-own energy production facilities

This approach involves the secretary of a military department entering into an agreement with a private sector entity to “lease-to-own” certain facilities provided at the expense of the contractor on a military installation. At the end of the lease, title to the property would vest in the United States. This approach can be used for a variety of facilities, including energy production facilities. Contract terms may not exceed 32 years.

### Contracts Key

#### Long term contracts key to market signal

Farrell 11

LIEUTENTANT GENERAL KEN EICKMANN, USAF (RET.) Former Commander, Aeronautical Systems Center, Wright-Patterson Afb, and LIEUTENANT GENERAL LAWRENCE P. FARRELL JR., USAF (RET.), Former Deputy Chief Of Staff For Plans And Programs, Headquarters U.S. Air Force, October 11, Ensuring America’s Freedom of Movement:, http://www.cna.org/sites/default/files/MAB4.pdf

Retired Air Force Lieutenant General Lawrence Farrell sees a limited, but important, role for the Pentagon in helping develop alternatives to petroleum. “I like relying on markets to do what they do well,” said Farrell. “For many years, market forces have inspired initiative, innovation, and creativity. I want to keep those forces intact. But one thing DOD can do well is to be a sort of forcing function. The Pentagon can say, ‘This is the direction we’re going, guys.’ You let the market know that there will be a consistent demand**.”** Changes may be required before the Pentagon can send the kinds of clear signals Farrell says are needed. “We need to make sure the Pentagon can effectively engage in long-term purchasing,” Farrell said. “Investors want to know how they’ll get paid back. If you want to rely on private money to develop alternatives to oil— and I think that’s the right approach—those investors need to understand there is a strong prospect of return. So you need this.” Retired Air Force Lieutenant General Kenneth Eickmann believes energy issues should be more visible within the DOD. “For too long, energy issues have been assumed away,” Eickmann said. “With respect to war games, until recently, you could always assume that whatever fuel you want or need is going to be there. We can’t do that anymore. And the same is true in society—we shouldn’t be taking our fuel for granted.” “With greater visibility should come better coordination within DOD, particularly if one of the goals is to send strong market signals,” he added.

#### Alt financing is key to utility operation of SMRs—CP causes expertise gap

GAO, April 2012, RENEWABLE ENERGY PROJECT FINANCING: Improved Guidance and Information Sharing Needed for DOD Project-Level Officials, http://gao.gov/assets/590/589883.pdf

Operation and maintenance of equipment. According to several officials, the operation and maintenance of equipment is a benefit of most alternatively financed projects and a drawback of projects funded with up-front appropriations. Projects financed with an alternative-financing approach generally involve the contractor operating and maintaining the equipment during the contract period, whereas the government typically is responsible for the operation and maintenance of equipment purchased with appropriated funds. Officials cited this as a significant benefit of alternatively financed projects—and a drawback of projects funded with up-front appropriations—because, according to the officials, installations often do not have personnel on-staff with the knowledge, skills, or expertise to operate and maintain the equipment needed to generate renewable energy. Officials noted, however, that for projects financed with Energy Savings Performance Contracts or Utility Energy Service Contracts, the contract period could be a relatively short period of time. According to these officials, after the contract period ends, the installation assumes ownership—and therefore the operation and maintenance—of the equipment, which can be a drawback of these two approaches.

### Delay

#### Causes years delay

McCormick, 12

(“Interview with Colin McCormick,” This interview was conducted with Dr. Colin McCormick, (Senior Advisor for R&D in the Office of the Under Secretary at the Department of Energy. He previously served as the Team Lead for Emerging Technologies in the Building Technologies Program of the Office of Energy Efficiency and Renewable Energy (EERE). Prior to joining the Department of Energy he was an energy and security analyst at the Federation of American Scientists, a staff member with the House Science and Technology Committee, and an AAAS Congressional Fellow on the staff of Rep. Ed Markey of Massachusetts. Dr. McCormick received his PhD in atomic and optical physics from the University of California, Berkeley, and did post-doctoral work in quantum optics at the National Institute of Standards and Technology (NIST) in the group of 1997 Physics Nobel Laureate William Phillips. Dr. McCormick reviewed, revised and approved the below text for publication. Specifically, this interview began as discussions that took place on October 17, 2012 and October 22, 2012, with questions being asked by members of GWDebate (Francisco Bencosme, Kevin Bertram, Lauren Cashmore, Paul Hayes, Joseph Nelson and Kyla Sommers). 10/17, http://debateandtherealworld.com/article.php?id=3)

D+TRW: What is your view on the suggestion that the DOD should pursue its own SMR or nuclear project apart from the DOE? McCormick: The DOD could build their own lab to research nuclear power, but that would be very inefficient and duplicative. It would also hire people away from DOE labs that are working on important projects. The DOD would have to build equipment, test chambers, radiation shields, etc. All of that already exists and is used at the DOE labs. It would seem very wasteful to try to pursue that. It would also delay efforts, for several years easily. The DOD does have laboratory infrastructure, but if you wanted to actually build nuclear test infrastructure, you would have to find a site not near population centers, would then have to have the site inspected by the NRC. And that's true even when it's the military. That would be a very long start up time. Not to mention extremely costly.

### Land

#### No land

King et al 11

Marcus, LaVar Huntzinger • Thoi Nguyen, CNA, March, “Feasibility of Nuclear Power on U.S. Military Installations” <https://cna.org/sites/default/files/research/Nuclear%20Power%20on%20Military%20Installations%20D0023932%20A5.pdf>

There are liabilities to having a nuclear power plant located on a military installation. First, the military installation must find and give up all other use of asmall area where the site is to be built. The site would need to be “not too near” to certain types of facilities. For example, not too near a hospital and not too near a facility that stores and handles explosives.Finding a specific site on an installation that is appropriate and suitable may be difficult. In addition, having a nuclear power plant on a military installation would almost certainly impose some restrictions on how land and airspace in the immediate vicinity of the nuclear plant could be used thereafter.

## Coal

#### Current regulations will kill the industry – Mandated CO2 reduction

Voyles 7/16

(Summary for Testimony of John N. Voyles, Jr. On behalf of LG&E and KU Energy LLC, 7/16/12 http:/

/republicans.energycommerce.house.gov/Media/file/Hearings/Energy/20120716/HHRG-112-

IF03-WState-VoylesJ-20120716.pdf)

While extremely problematic for new facilities, a single standard for all existing or modified ¶ fossil-fired units would have even more extreme impacts. A standard requiring each existing ¶ coal-fired unit to achieve CO2 reductions equivalent to a gas-fired unit would likely result in ¶ shutdown of virtually all coal-fired units in the nation. Such a result would wreak havoc with ¶ the nation’s energy supply in terms of both cost and reliability. In the state of Kentucky, and ¶ other Midwest states, where customers obtain more than 90% of their electricity supply from ¶ coal-fired generation, the outcome would be disastrous to the economies of those states. ¶ Although contrary to EPA’s stated policy, a single NSPS standard could also create a precedent ¶ for combining coal-fired and gas-fired units into one category for criteria air pollutant regulation ¶ and subjecting those units to standards that can only be achieved by combined cycle units.

#### China not switching to renewables – Coal consumption up

Lacey ‘12

(STEPHEN LACEY is a reporter/blogger for Climate Progress, where he writes on clean energy policy, technologies, and finance. Before joining CP, he was an editor/producer with RenewableEnergyWorld.com. He received his B.A. in journalism from Franklin Pierce University. “Coal Consumption in China Rises at Fastest Rate Since 2005” Feb 22, 2012 at 2:14 pm <http://thinkprogress.org/climate/2012/02/22/430441/coal-consumption-in-china/>, TSW)

Energy consumption figures just released by the Chinese government underscore how quickly coal use is booming in China, a country that is already the world’s largest emitter of greenhouse gases.¶ In 2011, China’s coal consumption increased by 9.7%, the most year-over-year growth seen since 2005. The country also saw a substantial increase in natural gas consumption, which climbed by 12% in 2011. The figures, released this week by the National Bureau of Statistics, show just how much work needs to be done in order to de-carbonize China’s rapidly growing energy system.¶ There are a few positive trends to report, however. Overall energy consumption per unit of GDP declined another 2% — continuing the 19.1% decline in energy intensity since 2005. In addition, solar installations increased by an astonishing 547% and wind installations grew by 48% last year.¶ Non-fossil fuels — solar PV, solar thermal, wind, and hydro — now account for 9.4% of China’s primary energy consumption. Officials expect renewables to make up roughly 11.4% of consumption by 2015 and energy intensity to decrease another 16% by 2015. China is also in the process of rolling out provincial greenhouse gas trading programs in an attempt to decrease emissions 45% by 2020 compared to 2005 levels.¶ These developments are promising, but they still don’t stop China’s rapid growth in emissions. Assuming a business-as-usual approach to energy development, the International Energy Agency projects that by the mid-2020s, China’s emissions will double those in the United States.

#### China increasing coal imports from North Korea – new mine

PERLEZ 8/21

(JANE PERLEZ / The New York Times “China-Korea Tensions Rise After Failed Venture” October 21, 2012 6:07 pm <http://www.post-gazette.com/stories/news/world/china-korea-tensions-rise-after-failed-venture-658555/>, TSW)

Lured by cheap iron ore and low wages, the Xiyang Group, one of China's biggest mining conglomerates, took a significant risk, building a mine in economically backward North Korea that was designed to feed China's steel mills and provide much-needed investment to China's impoverished ally.¶ Now that deal is in tatters. Xiyang says that the North Korean government sabotaged its $40 million investment, allowing the company to stay just long enough to steal its knowledge, then seizing the iron ore mine and sending armed guards to evict Chinese workers. And recent sniping over the failed venture has exposed the often testy relationship between China and North Korea that, in public, remains hidden beneath vows of friendship.¶ The business spat came into the open last month when Xiyang posted a gritty, salacious blog item describing what the company called its "nightmare" in running the mine. It included details of high living by the North Korean managers when they visited China, where they were said to have demanded female escorts, expensive alcohol and cars.¶ In a follow-up blog post this month, Wu Xisheng, the deputy general manager of Xiyang, demanded that North Korea stop its "illegal activities" at the mine and pay $31.2 million in compensation.¶ "We think they don't have that much money," he said in a recent interview, adding that his company had been negotiating for months with the state-run North Korean company for the compensation.¶ To the surprise of many, North Korea responded to Xiyang's accusations with some of its own, despite its heavy dependence on Chinese aid and the investment of Chinese companies. The Beijing office of the Joint Venture and Investment Committee of North Korea posted a note on its Web site saying that Xiyang had failed to provide up to half of the investment it promised even after several years, and that many laws and regulations had been passed to provide more legal protection for foreign investors.¶ An interview request with a manager at the investment office seeking more of North Korea's side in the dispute was declined.¶ The very public clash comes amid anticipation that the new leader of North Korea, Kim Jong-un, will open, even slightly, one of the world's last Communist redoubts.¶ To stand a chance of real economic advancement, analysts say, he would need continuing support from China. About two-thirds of the 305 foreign investments in North Korea are Chinese, according to a list published by the Open Source Center, a United States government intelligence organization that analyzes publicly available material. Japan comes next with 15 investments, according to the list.¶ By all accounts, Beijing has been encouraging Mr. Kim to introduce economic reform along the lines of the China model begun by Deng Xiaoping more than three decades ago.¶ But analysts say they expect China to help only so much. North Korea's greatest value to China, Chinese academics say, is as a buffer against the possibility of a united Korean Peninsula that could become an American ally. So while China would like the North Korean government to liberalize its economy to stave off a collapse, which would result in a flood of refugees into China, there is little appetite for North Korea to become too successful, lest it sever its dependence on China.¶ Already, both sides appear to have been disappointed.¶ Piao Guanjie, a researcher at the China Academy of Social Sciences, said the North Koreans often demand that China send its state-owned enterprises to open plants in North Korea, but the Chinese government always refuses.¶ "There is a big discrepancy between what North Korea expects and what China will do," she said.¶ At the same time, Mr. Kim seems to be going his own way, ignoring much of China's advice. Chinese academics say that Chinese officials have suggested that Mr. Kim modify his all-out spending on the military. That has not happened. A parliamentary session last month ended without a hoped-for announcement of large-scale agricultural reforms to ease grim food shortages, though defectors' groups report that pilot programs have begun under Mr. Kim.¶ Mr. Kim has also, in some ways, proved a tough sell, raising concerns about a linchpin of trade between the two countries: the mining of minerals that feeds China's need for raw materials and North Korea's desperate need for hard cash.¶ Unlike his father, Mr. Kim has complained that North Korea's resources, one of its few sources of outside income, are being sold off too cheaply, according to Chinese news media reports, and is demanding higher prices for its iron ore. That does not sit well with the bargain-conscious Chinese mine operators. (Mr. Wu, the Xiyang deputy general manager, said iron powder that costs about $60 a ton to produce in China costs only about $30 a ton to produce in North Korea.)¶ "The North Korean planned economy has an insatiable appetite for investment, and in the last couple of years, China and North Korea joint deals have increased in minerals, rare earths, coal," said Daniel Pinkston, the Northeast Asia deputy project director for the International Crisis Group in Seoul, South Korea. But the need for foreign investment does not mean any relaxation of the strict state-run economy, in which the means of production belong to the state, he said.

#### Existing carbon triggers the impact

Ridan ‘12

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

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

# 1AR

## Desal

**AT: No Water Impact**

**Water scarcity triggers conflict, not cooperation**

**Borer 4–** Prof. @ Naval Postgraduate School & Morrissette – Instructor @ University of Georgia - 2004

Parameters, December 22, 2004, Pg. 86(16) Vol. 34

Where oil and water do mix: environmental scarcity and future conflict in the Middle East and North Africa. In turn, numerous scholars in recent years have conceptualized water in security terms as a key strategic resource in many regions of the world. Thomas Naff maintains that water scarcity holds significant potential for conflict in large part because it is fundamentally essential to life. Naff identifies six basic characteristics that distinguish water as a vital and potentially contentious resource. (1) Water is necessary for sustaining life and has no substitute for human oranimal use. (2) Both in terms of domestic and international policy, water issues are typically addressed by policymakers in a piecemeal fashion rather than comprehensively. (3) Since countries typically feel compelled by security concerns to control the ground on of under which water flows, by its nature, water is also a terrain security issue. (4) Water issues are frequently perceived as zero-sum, as actors compete for the same limited water resources. (5) As a result of the competition for these limited resources, water presents a constant potential for conflict. (6) International law concerning water resources remains relatively "rudimentary" and "ineffectual." (6) As these factors suggest, water is a particularly volatile strategic issue, especially when it is in severe shortage.

### A2: Turn

**No damage to the ocean and the alt is worse**

Manuel **Schiffler**, economist in the World Bank's Middle East and North Africa Region, 200**4**, Perspectives and challenges for desalination in the 21st century, Desalination 165, 1-9

The environmental footprint of desalination has been reduced through technological progress. However, some significant environmental impacts remain, in particular during the operating phase of the plants. One major impact is the discharge of brine — a concentrated salt solution that may be hot and may contain various chemicals — on coastal or marine eco-systems or, in the case of inland brackish water desalination, on rivers and aquifers. Another major impact is the emission of greenhouse gases in the production of electricity and steam needed to power the desalination plants. Furthermore, abstraction of brackish groundwater for desalination can have significant environ- mental impacts. Other impacts of usually more limited nature include noise, visual disturbance, interference with public access and recreation, possible impacts from seawater intakes, as well as various environmental impacts during the construction phase and potential impacts from accidental spills. There can also be positive environmental impacts from desalination, if desalination reduces the pressure on conventional water resources. In particular, seawater desalination can help to relieve the pressure on overexploited coastal aquifers and thus prevents seawater intrusion, a widespread phenomenon causing quasi-irreversible damage in coastal areas around the world. In some cases, seawater desalination can be an alternative to the use of fossil groundwater further inland or to the construction of large dams and inter-basin transfers that are usually associated with significant social and environmental costs. An internationally agreed environmental assessment methodology for desalination plants does not exist so far and its development would be desirable. In assessing the environmental impact of numerous desalination projects on the marine environment, it is important to assess the cumulative impacts of new and existing plants as well as of discharges from other sources. A strategic environmental assessment is more appropriate for that purpose than a series of isolated, project- related environmental assessments. In many of the focal countries of the present study, the legal basis and institutional capacity for environmental assessments in general is weak and there is no or very little experience with environmental assessments of individual desalination projects, not to speak of strategic environmental assessments. To the author’s best knowledge, no stra- tegic environmental assessment of brine dis- charges into the Arab Gulf (Persian Gulf), which is a shallow, nearly closed water body that receives the highest discharge of brine from desalination processes in the world, has been undertaken to date. While impacts obviously differ depending on the characteristics and sensitivity of the local marine environment, future impacts from brine discharge into the Mediterranean are expected to be relatively limited compared to impacts in the Arab Gulf, but may be more restrictive if European directives are applied in future EuroMed agreements. Mitigation measures include preventive mea- sures, such as the strengthening of environmental institutions and water conservation, and reactive measures, which involve physical changes to a plant or process. The latter include optimized siting in the construction phase, the use of more energy-efficient technologies, design and treatment techniques to reduce damage to the marine environment, including the appropriate design of sea outfalls and the mixing of brine with seawater before discharge, and architectural measures to reduce visual impact especially for tourism purposes.

### A2: Fossil Fuels

**No offense—fossil fuel based global desal inevitable, but is unsustainable—nuclear shift key**

I. **Khamis**, IAEA, 200**9**, A global overview on nuclear desalination, Int. J. Nuclear Desalination, Vol. 3, No. 4

As desalination and water reuse expansion in the Middle East and the world continues at a rapid pace, these innovations must be integrated into the next generation of water facilities. The integrated nuclear energy systems would lead to **considerably lower** power and water costs than the corresponding coal-based systems. When external costs for different energies are internalised in power and water costs, the relative cost differences are considerably increased in favour of the nuclear systems. Financial analysis further confirms these conclusions (Nisan et al., 2007; Wade, 2001). Integrated seawater desalination systems are likely to be deployed intensively in the future in view of the very high demands for water and electrical energy in many regions of the world. A future desalination strategy based uniquely on the utilisation of fossil-fuelled systems is **not sustainable** because of the high carbon footprint from both power generation and desalination. At the moment, the **only solution** to reduce the carbon footprint of integrated desalination systems appears to be by utilising nuclear and renewable energies (International Atomic Energy Agency, 2008b).

### U.s. key

#### The US is key- gold standard

Levy, 12

(Edward Levy recently graduated with an MSc in Globalisation and Development from London University’s School of Oriental and African Studies, “Small Modular Reactors: What’s on the Horizon for 2012?” <http://analysis.nuclearenergyinsider.com/small-modular-reactors/small-modular-reactors-what%E2%80%99s-horizon-2012>)

**While Europe, Russia, China, Korea and other places are developing small reactors**, most of these designs consist of single or double modules, mounted above ground, on barges, or in submarines. However, the drive toward multi-modular plants with underground containment is led by the Americans and Japanese. Looking out for the little guy While money is not an existential issue for the SMR divisions of the larger entities involved like Toshiba/Westinghouse, B&W and GE Hitachi, some of the most innovative designs are being promoted by much smaller American companies to whom financing has been of great concern. These worries have been alleviated for some, with Fluor now backing NuScale. Even so, money is vital especially for those with comparatively limited resources, like Hyperion Power Generation. It will continue to gain importance as potential manufacturers progress to design certification and beyond. This is what makes the DOE’s recent news of particular interest. The announced government support may level the playing field among American competitors, hopefully enabling those with the best product, and not necessarily the most money, to gain crucial government support. While B&W and its peers could likely absorb the impact of unintended consequences or mistakes along the way to creating a viable SMR, the odds of smaller companies faring similarly are unlikely. On this front, it is difficult to anticipate how some of the larger corporations’ actions will affect themselves and their competitors. First mover tactics NuScale is positioned to become the first to submit a full design certification application to the NRC, intending to do so later this year, B&W has already signed a letter of intent with the Tennessee Valley Authority for its first units, even though the manufacturer will not submit its paperwork until at least 2013. B&W’s move to secure a buyer early on might prove advantageous. Edward Levy recently graduated with an MSc in Globalisation and Development from London University’s School of Oriental and African Studies. However, any bureaucratic delays could allow others to get ahead, a situation that might impact the company negatively, given that American design certification and licensing approval are commonly viewed as a gold standard, with instant credibility enabling expansion to international markets. Thus, most of the leading SMR companies seem determined to prove their reactors’ effectiveness and practicality in the United States before looking elsewhere. If they are successful, additional commercial avenues could quickly follow.

## Alt Financing

### Alt Financing Inevitable

#### Increase in alt financing of renewable energy is inevitable

GAO 12

(United States Government Accountability Office, “RENEWABLE ¶ ENERGY PROJECT ¶ FINANCING¶ Improved Guidance ¶ and Information ¶ Sharing Needed for ¶ DOD Project-Level ¶ Officials” <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518>)

Moving forward, DOD plans to expand its use of alternative-financing ¶ approaches for renewable energy projects. In its Strategic Management ¶ Plan for fiscal years 2012 and 2013, DOD established a goal to increase ¶ operational and installation energy efficiency to reduce costs and improve ¶ energy security, among other benefits.¶ One of the key initiatives within ¶ this goal is to expand the use of alternative financing for energy efficiency ¶ and renewable energy projects by 15 percent, as measured by the dollar value of awarded contracts, by the end of fiscal year 2015. According to ¶ DOD’s annual energy management report for fiscal year 2010, DOD ¶ awarded $323 million in contracts for energy efficiency and renewable ¶ energy projects that were financed with Energy Savings Performance ¶ Contracts and Utility Energy Service Contracts. Thus, DOD would need ¶ to award nearly $50 million more in contracts, or a total of about $372 ¶ million, to meet this goal. An official from the Office of the Deputy Under ¶ Secretary of Defense (Installations and Environment) said that the Office ¶ of the Secretary of Defense plans to measure progress toward the goal ¶ annually based on the military services’ submissions for DOD’s Annual ¶ Energy Management Report. At the time of our review, the Office of the ¶ Secretary of Defense had not provided information to the military services ¶ about the goal, but an official said that the office is establishing a working ¶ group to assist the services in initiating and completing projects financed ¶ with alternative-financing approaches through improved collaboration and ¶ communication among stakeholders and sharing best practices.

#### Financing now

GAO 12

(United States Government Accountability Office, “RENEWABLE ¶ ENERGY PROJECT ¶ FINANCING¶ Improved Guidance ¶ and Information ¶ Sharing Needed for ¶ DOD Project-Level ¶ Officials” <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518>)

To finance renewable energy projects, the military services use up-front¶ appropriations, such as operation and maintenance funds, and alternative financing approaches that generally rely on private capital, such as arranging ¶ financing and implementing a project with a private developer or utility. The ¶ military services have funded about 85 percent of nearly 600 projects that were in ¶ design, under construction, or operating in fiscal year 2011 with up-front¶ appropriations, but financed 8 of the 9 large-scale projects and 19 of the 57 ¶ medium-scale projects with alternative financing. Several factors affect the ¶ military services’ use of financing approaches, including perceived benefits and ¶ drawbacks such as how long it takes to obtain funding.

### 1AR Not Renewables

#### More evidence- the military doesn’t consider nuclear to be a renewable.

GAO 12

(United States Government Accountability Office, “RENEWABLE ¶ ENERGY PROJECT ¶ FINANCING¶ Improved Guidance ¶ and Information ¶ Sharing Needed for ¶ DOD Project-Level ¶ Officials” <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518>)

To the extent economically feasible and technically practicable, consume renewable ¶ energy equal to at least 3 percent of all electrical energy consumed from fiscal year ¶ 2007 to fiscal year 2009, with increases to 5 percent in fiscal year 2010 through fiscal ¶ year 2012, and 7.5 percent in fiscal year 2013 and thereafter. The statute also ¶ provides additional credit toward these goals for agencies with renewable electricity ¶ produced on site subject to certain conditions.¶ For the purposes of this goal, the term “renewable energy” means electric energy ¶ generated from solar, wind, biomass, landfill gas, ocean (including tidal, wave, ¶ current, and thermal), geothermal, municipal solid waste, or new hydroelectric ¶ generation capacity achieved from increased efficiency or additions of new capacity ¶ at an existing hydroelectric project.

#### Nuclear is excluded from RECs

GAO 12

(“RENEWABLE ¶ ENERGY PROJECT ¶ FINANCING¶ Improved Guidance ¶ and Information ¶ Sharing Needed for ¶ DOD Project-Level ¶ Officials” http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518)

This appendix provides information on the scope of our work and ¶ methodology to (1) determine the approaches that the military services ¶ are using to finance renewable energy projects on military installations ¶ and the factors that the services consider in selecting a financing ¶ approach, (2) assess the extent to which the military services have ¶ established methods to obtain good value and advantageous contract ¶ terms for renewable energy projects on installations and maximize ¶ benefits and mitigate drawbacks or risks of financing approaches, and (3) ¶ identify the extent to which the military services have developed ¶ guidance, training, and other resources to assist officials in selecting and ¶ implementing financing approaches for renewable energy projects. For ¶ the purposes of this review, we defined “renewable energy” as energy ¶ derived from any of the following fuel sources: biomass; geothermal; ¶ hydropower; solar; wind; ocean energy, including wave, tidal, current, and ¶ ocean thermal energy; and other sources, such as landfill gas and ¶ municipal solid waste, that are constantly replenished. This energy can be ¶ applied in any form, including electricity, heating, or small-scale ¶ applications such as streetlights or trash compactors. Our definition ¶ differs from the definitions used for computation of the relevant federal ¶ energy goals, as noted in the body of the report. We focused on facilities¶ energy efforts in the United States and overseas and excluded ¶ operational energy and vehicles from our review. Additionally, we focused ¶ on the military services’ renewable energy efforts—which comprise the ¶ vast majority of DOD’s renewable energy projects—and excluded the ¶ defense agencies and other defense organizations from our review since ¶ their projects represent a small subset of the total. Finally, we focused on ¶ DOD’s efforts to generate renewable energy and excluded from our ¶ review nuclear energy and efforts that only addressed energy efficiency ¶ or conservation.

### Procurement Fails

#### Procurement fails- can’t run reactors

GAO ’12

“Renewable Energy Project Financing,” <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518>

Operation and maintenance of equipment. According to several¶ officials, the operation and maintenance of equipment is a benefit of¶ most alternatively financed projects and a drawback of projects¶ funded with up-front appropriations. Projects financed with an¶ alternative-financing approach generally involve the contractor¶ operating and maintaining the equipment during the contract period,¶ whereas the government typically is responsible for the operation and¶ maintenance of equipment purchased with appropriated funds.¶ Officials cited this as a significant benefit of alternatively financed¶ projects—and a drawback of projects funded with up-front¶ appropriations—because, according to the officials, installations often¶ do not have personnel on-staff with the knowledge, skills, or expertise¶ to operate and maintain the equipment needed to generate renewable¶ energy. Officials noted, however, that for projects financed with¶ Energy Savings Performance Contracts or Utility Energy Service¶ Contracts, the contract period could be a relatively short period of¶ time. According to these officials, after the contract period ends, the installation assumes ownership—and therefore the operation and¶ maintenance—of the equipment, which can be a drawback of these¶ two approaches.

### Do Both

**Counterplan is an example of the aff**

**GAO 12**

(United States Government Accountability Office, “RENEWABLE ¶ ENERGY PROJECT ¶ FINANCING¶ Improved Guidance ¶ and Information ¶ Sharing Needed for ¶ DOD Project-Level ¶ Officials” <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518>)

.

**Counterplan is an example of the aff**

**GAO 12**

(United States Government Accountability Office, “RENEWABLE ¶ ENERGY PROJECT ¶ FINANCING¶ Improved Guidance ¶ and Information ¶ Sharing Needed for ¶ DOD Project-Level ¶ Officials” <http://www.dtic.mil/cgi-bin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA558518>)

Alternative-financing approaches

Energy Savings Performance Contract ¶ (ESPC)

An Energy Savings Performance Contract is a ¶ contract between a federal agency and an ¶ energy service provider. Based on the results ¶ of a comprehensive energy audit, an energy ¶ service company, in consultation with the ¶ federal agency, designs and constructs a ¶ project to save energy and arranges the ¶ necessary financing. The contractor ¶ guarantees that the improvements will ¶ generate energy cost savings sufficient to pay ¶ for the project over the term of the contract. ¶ Contract terms for Energy Savings ¶ Performance Contracts can extend up to 25 ¶ years.

In its annual energy management report, DOD ¶ reported that the department awarded 22 ¶ projects through Energy Savings Performance ¶ Contracts totaling $277 million in fiscal year ¶ 2010; however, most of these were energy ¶ efficiency, not renewable energy, projects.

Naval Air Station Oceana implemented a ¶ number of ground source heat pump ¶ projects that service more than 1.5 million ¶ square feet of facilities, including some ¶ projects financed through Energy Savings ¶ Performance Contracts.

Hill Air Force Base financed a landfill gasto-energy project with a total capacity of ¶ 2.3 megawatts through an Energy Savings ¶ Performance Contract.

Fort Bliss financed a solar thermal system ¶ to heat a swimming pool—among other ¶ energy conservation measures—through ¶ an Energy Savings Performance Contract.

Utility Energy Service Contract (UESC)   
In a Utility Energy Service Contract, a utility ¶ arranges financing to cover the capital costs of ¶ a project, which are repaid by the agency, ¶ generally using appropriated funds, over the ¶ contract term. Repayments are usually based ¶ on estimated cost savings generated by the ¶ energy efficiency measures, but energy ¶ savings are not necessarily required to be ¶ guaranteed by the contractor.

In its annual energy management report, DOD ¶ reported that the department awarded 14 ¶ projects through Utility Energy Service ¶ Contracts totaling $46 million in fiscal year ¶ 2010; however, most of these were energy ¶ efficiency projects.

Naval Air Station Jacksonville financed a ¶ solar thermal heating project for the Navy ¶ Bureau of Medicine and Surgery pool and ¶ a solar-powered entrance sign through ¶ Utility Energy Service Contracts.¶ Fort Knox financed a 1.8-kilowatt wind ¶ turbine through a Utility Energy Service ¶ Contract.

Power purchase agreement (PPA)

Power purchase agreements for renewable ¶ energy may take several forms, but all are ¶ essentially agreements to purchase renewable ¶ energy from a private-sector energy producer. ¶ For example, in some of these agreements, ¶ the developer installs a renewable energysystem on agency property, and the agency ¶ pays for the system through its purchase of ¶ power over the life of the contract. After ¶ installation, the developer owns, operates, and ¶ maintains the system for the life of the ¶ contract. DOD refers to power purchase ¶ agreements undertaken using certain ¶ authorities as Energy Services Contracts. ¶ Depending on the authority used, DOD can ¶ enter into power purchase agreements for up ¶ to 32 years, excluding the period for ¶ construction.

Nellis Air Force Base purchases electricity ¶ generated by the 14 megawatt solar array ¶ owned by a private contractor and located ¶ on the installation.

Marine Corps Air Station Miramar plans to ¶ purchase three megawatts of electricity ¶ generated by landfill gas from a ¶ contractor. The landfill is located on Navy ¶ property leased to the City of San Diego.

Enhanced-use lease (EUL)

An enhanced-use lease allows the military ¶ services to outlease available nonexcess real ¶ property to the private sector in return for cash ¶ or in-kind consideration, subject to certain ¶ conditions. Enhanced-use leases have been ¶ used for a wide range of facility improvement ¶ projects, renovations, repair, or new ¶ acquisitions, to include renewable energy ¶ projects. The length of a contract for an ¶ enhanced-use lease is subject to certain ¶ conditions, but there is no firm time limit. We ¶ have previously reported that these leases are ¶ often entered into for long periods, such as 25- ¶ or 50-year terms.

The Army is currently developing a project ¶ at Fort Irwin in which the Army would ¶ lease land to a contractor to build a 500-¶ megawatt solar array.

Convey utility system to a utility company

In this approach the secretary of a military ¶ department may convey existing utility systems ¶ owned by DOD to a utility company in ¶ exchange for compensation. One type of ¶ contemplated compensation is provision of ¶ power at reduced rates. Contracts for provision ¶ of power in exchange for conveyance of a ¶ utility system are limited to 10 years or, subject ¶ to certain conditions, up to 50 years.

According to military service officials, the ¶ services have not used this authority for ¶ renewable energy projects on military ¶ installations.

Sell electricity to a utility

This approach involves the secretary of a ¶ military department selling certain kinds of ¶ electricity generated on a military installation to ¶ a utility (subject to certain requirements) and ¶ depositing the proceeds in the appropriation ¶ account available to the relevant military ¶ department for the supply of electrical energy. ¶ Those funds may be used (under certain ¶ conditions) to finance certain energy related ¶ military construction projects.

The Navy used this authority for its ¶ geothermal plant at Naval Air Weapons ¶ Station China Lake, California.

According to military service officials, the ¶ Army, Marine Corps, and Air Force have¶ not used this authority for renewable ¶ energy projects on military installations.

Lease-to-own energy production facilities

This approach involves the secretary of a ¶ military department entering into an agreement ¶ with a private sector entity to “lease-to-own” ¶ certain facilities provided at the expense of the ¶ contractor on a military installation. At the end ¶ of the lease, title to the property would vest in ¶ the United States. This approach can be used ¶ for a variety of facilities, including energy ¶ production facilities. Contract terms may not ¶ exceed 32 years.

According to military service officials, the ¶ services have not used this authority for ¶ renewable energy projects on military ¶ installations.

## Coal

### Coal

**Production of coal surged 12%**

**Walker and Nazareth 8/22**

(Susanne Walker and Rita Nazareth of Bloomberg “Treasuries Retreat With U.S. Stocks as Oil, Metal Prices Decline” Published 10:12 a.m., Monday, October 22, 2012 <http://www.sfgate.com/business/bloomberg/article/Treasuries-Retreat-With-U-S-Stocks-as-Oil-Metal-3971403.php>,TSW)

Market Movers¶ The S&P 500 ended last week up 0.3 percent as a three-day rally was almost wiped out by a tumble on the final session. The index dropped 1.7 percent on Oct. 19, the most since June, as companies from General Electric Co. to McDonald’s Corp. and Microsoft Corp. posted results below estimates.¶ Per-share profits have topped estimates at 69 percent of the 123 companies in the S&P 500 that have released earnings, according to data compiled by Bloomberg.¶ SunTrust Banks Inc., the eighth-largest U.S. lender, tumbled 3.2 percent after profit missed analysts’ estimates. VF Corp. declined 4 percent as sales trailed the average forecast and the clothing company said the European market remains challenging.¶ Peabody Energy Corp., the largest U.S. coal producer by volume, surged 12 percent after reporting third-quarter earnings that beat analysts’ estimates after selling more coal from its mines in Australia and Wyoming’s Powder River Basin.¶ Caterpillar Inc., the world’s largest maker of construction and mining equipment, climbed 1.4 percent after reporting earnings that beat analysts’ estimates, while also predicting sales growth for next year that is the slowest in four years as the global economy decelerates

### Always Demand

**China will always have high demand for coal**

**Jenkins ‘10**

(Jesse Jenkins, former Director of Energy and Climate Policy at Breakthrough Institute, “China Energy Use to Soar, Driving Demand for Coal, Oil & Clean Energy Alike,” 11/10/10) http://theenergycollective.com/jessejenkins/46951/china-energy-use-soar-driving-demand-coal-oil-clean-energy-alike)

China's demand for energy will soar 75% by 2035, according to the latest world energy forecast from the International Energy Agency (IEA), released Tuesday. The growing economic aspirations of 1.3 billion Chinese, who today use just one-third the amount of energy consumed by an average European or North American, will put pressure on global energy markets, driving demand for both clean and dirty energy alike.¶ Oil prices will rise to $113 per barrel (in constant 2009 dollars) by 2035, as oil producers struggle to keep pace with soaring global demand, according the IEA, the world's global energy watchdog, based in Paris.¶ Oil markets will remain tight through much of this period, the agency expects, writing that "short‐term price volatility is likely to remain high."¶ Much of the pressure on global energy markets will come from China, which will account for more than one-third of all global energy demand growth over the next 25 years, according to the IEA.¶ “Chinese energy demand will grow by such huge terms it will put pressure on the global energy markets in terms of oil, coal and, to a lesser extent, natural gas,” said Faith Birol, the IEA's chief economist, speaking to the New York Times.¶ All told, the IEA expects virtually all (93%) of the increase in global energy demand will be driven by developing (non-OECD) nations. After China, the next largest driver of energy demand growth.

**Locked in**

**Low threshold—less than 2 degrees is sufficient to cause their impacts**

**Harvey 11**

Harvey, environment reporter – the Guardian, 11/9/’11¶ (Fiona, <http://www.guardian.co.uk/environment/2011/nov/09/fossil-fuel-infrastructure-climate-change>)

Climate scientists estimate that global **warming of 2C** above pre-industrial levels **marks the limit of safety,** **beyond which climate change becomes catastrophic and irreversible.** Though **such estimates are necessarily imprecise**, **warming of as little as 1.5C could cause dangerous rises in sea levels and** a higher risk of extreme **weather** – the limit of 2C is now inscribed in international accords, including the partial agreement signed at Copenhagen in 2009, by which the biggest developed and developing countries for the first time agreed to curb their greenhouse gas output.

**Gas and developing countries offset US emissions reductions**

**Marshall 8/20**

Marshall, climate reporter – New Scientist, 8/20/’12¶ (Michael, <http://www.newscientist.com/article/dn22196-lowest-us-carbon-emissions-wont-slow-climate-change.html>)

**It looks like good news, but it's not.** **The US** has **recorded a sharp fall in its** greenhouse gas **emissions** from energy use. Thanks to a rise in the use of natural gas, emissions are at their lowest since 1992. The fall will boost the natural gas industry, **but** in reality the **emissions have simply been exported.**¶ According to the US Energy Information Administration (EIA), energy-related **CO2 emissions** in the first quarter of 2012 **were the lowest in two decades.** Emissions are normally high between January and March because people use more heating in the winter, but last winter was mild in the US.¶ The EIA says that an increase in gas-fired power generation, and a corresponding decline in coal-fired, contributed to the fall in emissions. Burning natural gas produces fewer emissions than burning coal, and natural **gas is currently unusually cheap** in the US **thanks to a glut of shale gas** extracted by hydraulic fracturing or "fracking".¶ If gas companies continue to expand their shale gas operations, the US could generate even more electricity from gas, and its **emissions could fall for several years**, says Kevin Anderson of the University of Manchester, UK.¶ However, **this will not slow down climate change.** US **coal** consumption has fallen, but **production is holding steady and the surplus is being sold to Asia.** As a result, **the US is effectively exporting the coal-related emissions.**¶ "Gas is less bad than burning the coal, but only if you keep the coal in the ground," Anderson says.¶ Proponents of **natural gas** argue that it is a "transition fuel" that we can burn for a few years while we install low-carbon infrastructure such as wind farms and nuclear power stations.¶ That viewpoint **looks increasingly untenable. "If we want even an outside chance of** [**limiting** global **warming** to] 2 °C, **there is no emission space for gas**," Anderson saays. In order to hit the 2 °C target, global emissions need to peak by 2020 before dropping again, which means making a rapid transition to low-carbon energy.

**Warming locked in—current construction and no international deal means it will be runaway**

**Harvey 11**

Harvey, environment reporter – the Guardian, 11/9/’11

(Fiona, <http://www.guardian.co.uk/environment/2011/nov/09/fossil-fuel-infrastructure-climate-change>)

**The world is likely to build so many fossil-fuelled power stations, energy-guzzling factories and inefficient buildings in the next five years that it will become impossible to hold** global **warming to safe levels**, **and the** last **chance of combating** dangerous **climate change will be "lost for ever**", according to the most thorough analysis yet of world energy infrastructure.¶ **Anything built from now on that produces carbon will do so for decades, and this "lock-in" effect will be the single factor most likely to produce irreversible climate change**, **the world's foremost authority on energy economics has found.** If this is not rapidly changed within the next five years, **the results are likely to be disastrous.**¶ "**The door is closing**," Fatih **Birol, chief economist at the International Energy Agency, said**. "I am very worried – if we don't change direction now on how we use energy, we will end up beyond what scientists tell us is the minimum [for safety]. **The door will be closed forever."**¶ **If the world is to stay below 2C** of warming, which scientists regard as the limit of safety, then **emissions must be held to no more than 450** parts per million (**ppm**) of carbon dioxide in the atmosphere; the level is currently around 390ppm. **But the world's existing infrastructure is already producing 80% of that "carbon budget**", according to the IEA's analysis, published on Wednesday. **This gives an ever-narrowing gap in which to reform the global economy** on to a low-carbon footing.¶ **If** current trends continue, and **we go on building high-carbon energy generation, then** by 2015 **at least 90% of the available "carbon budget" will be swallowed** up by our energy and industrial infrastructure. By 2017, there will be no room for manoeuvre at all – the whole of the carbon budget will be spoken for, according to the IEA's calculations.¶ Birol's warning comes at a crucial moment in international negotiations on climate change, as governments gear up for the next fortnight of talks in Durban, South Africa, from late November. "**If we do not have an international agreement**, whose effect is put in place **by 2017**, then **the door** to [holding temperatures to 2C of warming] **will be closed forever**," said Birol.¶ **But world governments are preparing to postpone** a speedy conclusion to the **negotiations** again. Originally, the aim was to agree a successor to the 1997 Kyoto protocol, the only binding international agreement on emissions, after its current provisions expire in 2012. But after years of setbacks, **an increasing number of countries – including the UK, Japan and Russia – now favour postponing the talks for several years.**¶ Both **Russia and Japan have spoken** in recent weeks **of** aiming for **an agreement in 2018 or 2020**, and the UK has supported this move. Greg Barker, the UK's climate change minister, told a meeting: "We need China, the US especially, the rest of the Basic countries [Brazil, South Africa, India and China] to agree. If we can get this by 2015 we could have an agreement ready to click in by 2020." Birol said this would clearly be too late. "I think it's very important to have a sense of urgency – our analysis shows [what happens] if you do not change investment patterns, which can only happen as a result of an international agreement."¶ **Nor is this a problem of the developing world**, as some commentators have sought to frame it. **In the UK**, **Europe and the US, there are multiple plans for new fossil-fuelled power stations** that would contribute significantly to global emissions over the coming decades.¶ The Guardian revealed in May **an IEA analysis** that **found emissions had risen by a record amount in 2010, despite the** worst **recession** for 80 years. Last year, a record 30.6 gigatonnes (Gt) of carbon dioxide poured into the atmosphere from burning fossil fuels, a rise of 1.6Gt on the previous year. At the time, Birol told the Guardian that constraining global warming to moderate levels would be "only a nice utopia" unless drastic action was taken.¶ The new research adds to that finding, by showing in detail how **current choices on** building **new** energy and **industrial infrastructure are likely to commit the world to** much higher **emissions for the next few decades**, **blowing apart hopes of containing the problem** to manageable levels. **The IEA's data is** regarded as **the gold standard in emissions and energy, and** is widely regarded as **one of the most conservative in outlook** – **making the warning all the more stark.** The central problem is that **most industrial infrastructure** currently in existence – the fossil-fuelled **power stations**, the emissions-spewing **factories**, the **inefficient transport and buildings – is already contributing to** the high level of **emissions, and will do so for decades.** Carbon dioxide, once released, stays in the atmosphere and continues to have a warming effect for about a century, and industrial infrastructure is built to have a useful life of several decades.¶ Yet, despite intensifying warnings from scientists over the past two decades, the new infrastructure even now being built is constructed along the same lines as the old, which means that there is a "lock-in" effect – high-carbon infrastructure built today or in the next five years will contribute as much to the stock of emissions in the atmosphere as previous generations.¶ **The "lock-in" effect is the single most important factor increasing the danger of runaway climate change**, according to the IEA in its annual World Energy Outlook, published on Wednesday.

**Existing carbon triggers the impact**

**Rirdan 12**

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

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