# 1AC

## plan

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

## dod

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

Robitaille 12

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

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

#### Those communication breakdowns go nuclear

Andres and Breetz 11

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

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

#### Grid failure shuts down US military operations

Paul Stockton 11, 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.

#### Nuclear war

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

We live at a time when wars not only rage in nearly every region but threaten to erupt in many places where the current relative calm is tenuous. To view this as a strategic military challenge for the United States is not to espouse a specific theory of America’s role in the world or a certain political philosophy. Such an assessment flows directly from the basic bipartisan view of American foreign policy makers since World War II that overseas threats must be countered before they can directly threaten this country’s shores, that the basic stability of the international system is essential to American peace and prosperity, and that no country besides the United States is in a position to lead the way in countering major challenges to the global order. Let us highlight the threats and their consequences with a few concrete examples, emphasizing those that involve key strategic regions of the world such as the Persian Gulf and East Asia, or key potential threats to American security, such as the spread of nuclear weapons and the strengthening of the global Al Qaeda/jihadist movement. The Iranian government has rejected a series of international demands to halt its efforts at enriching uranium and submit to international inspections. What will happen if the US—or Israeli—government becomes convinced that Tehran is on the verge of fielding a nuclear weapon? North Korea, of course, has already done so, and the ripple effects are beginning to spread. Japan’s recent election to supreme power of a leader who has promised to rewrite that country’s constitution to support increased armed forces—and, possibly, even nuclear weapons— may well alter the delicate balance of fear in Northeast Asia fundamentally and rapidly. Also, in the background, at least for now, SinoTaiwanese 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.

#### States will inevitably compete for relative status–only primacy can prevent conflict

**Wohlforth 9**,

Professor of government at Dartmouth, (William, “Unipolarity, Status Competition, and Great Power War” World Politics, 61:1, January, Project Muse)

Second, I question the dominant view that status quo evaluations are relatively independent of the distribution of capabilities. If the status of states depends in some measure on their relative capabilities, and if states derive utility from status, then different distributions of capabilities may affect levels of satisfaction, just as different income distributions may affect levels of status competition in domestic settings. 6 Building on research in psychology and sociology, I argue that even capabilities distributions among major powers foster ambiguous status hierarchies, which generate more dissatisfaction and clashes over the status quo. And the more stratified the distribution of capabilities, the less likely such status competition is. Unipolarity thus generates far fewer incentives than either bipolarity or multipolarity for direct great power positional competition over status. Elites in the other major powers continue to prefer higher status, but in a unipolar system they face comparatively weak incentives to translate that preference into costly action. And the absence of such incentives matters because social status is a positional good—something whose value depends on how much one has in relation to others.7 “If everyone has high status,” Randall Schweller notes, “no one does.”8 While one actor might increase its status, all cannot simultaneously do so. High status is thus inherently scarce, and competitions for status tend to be zero sum.9 I begin by describing the puzzles facing predominant theories that status competition might solve. Building on recent research on social identity and status seeking, I then show that under certain conditions the ways decision makers identify with the states they represent may prompt them to frame issues as positional disputes over status in a social hierarchy. I develop hypotheses that tailor this scholarship to the domain of great power politics, showing how the probability of status competition is likely to be linked to polarity. The rest of the article investigates whether there is sufficient evidence for these hypotheses to warrant further refinement and testing. I pursue this in three ways: by showing that the theory advanced here is consistent with what we know about large-scale patterns of great power conflict through history; by [End Page 30] demonstrating that the causal mechanisms it identifies did drive relatively secure major powers to military conflict in the past (and therefore that they might do so again if the world were bipolar or multipolar); and by showing that observable evidence concerning the major powers’ identity politics and grand strategies under unipolarity are consistent with the theory’s expectations. Puzzles of Power and War Recent research on the connection between the distribution of capabilities and war has concentrated on a hypothesis long central to systemic theories of power transition or hegemonic stability: that major war arises out of a power shift in favor of a rising state dissatisfied with a status quo defended by a declining satisfied state.10 Though they have garnered substantial empirical support, these theories have yet to solve two intertwined empirical and theoretical puzzles—each of which might be explained by positional concerns for status. First, if the material costs and benefits of a given status quo are what matters, why would a state be dissatisfied with the very status quo that had abetted its rise? The rise of China today naturally prompts this question, but it is hardly a novel situation. Most of the best known and most consequential power transitions in history featured rising challengers that were prospering mightily under the status quo. In case after case, historians argue that these revisionist powers sought recognition and standing rather than specific alterations to the existing rules and practices that constituted the order of the day. In each paradigmatic case of hegemonic war, the claims of the rising power are hard to reduce to instrumental adjustment of the status quo. In R. Ned Lebow’s reading, for example, Thucydides’ account tells us that the rise of Athens posed unacceptable threats not to the security or welfare of Sparta but rather to its identity as leader of the Greek world, which was an important cause of the Spartan assembly’s vote for war.11 The issues that inspired Louis XIV’s and Napoleon’s dissatisfaction with the status quo were many and varied, but most accounts accord [End Page 31] independent importance to the drive for a position of unparalleled primacy. In these and other hegemonic struggles among leading states in post-Westphalian Europe, the rising challenger’s dissatisfaction is often difficult to connect to the material costs and benefits of the status quo, and much contemporary evidence revolves around issues of recognition and status.12 Wilhemine Germany is a fateful case in point. As Paul Kennedy has argued, underlying material trends as of 1914 were set to propel Germany’s continued rise indefinitely, so long as Europe remained at peace.13 Yet Germany chafed under the very status quo that abetted this rise and its elite focused resentment on its chief trading partner—the great power that presented the least plausible threat to its security: Great Britain. At fantastic cost, it built a battleship fleet with no plausible strategic purpose other than to stake a claim on global power status.14 Recent historical studies present strong evidence that, far from fearing attacks from Russia and France, German leaders sought to provoke them, knowing that this would lead to a long, expensive, and sanguinary war that Britain was certain to join.15 And of all the motivations swirling round these momentous decisions, no serious historical account fails to register German leaders’ oft-expressed yearning for “a place in the sun.” The second puzzle is bargaining failure. Hegemonic theories tend to model war as a conflict over the status quo without specifying precisely what the status quo is and what flows of benefits it provides to states.16 Scholars generally follow Robert Gilpin in positing that the underlying issue concerns a “desire to redraft the rules by which relations among nations work,” “the nature and governance of the system,” and “the distribution of territory among the states in the system.”17 If these are the [End Page 32] issues at stake, then systemic theories of hegemonic war and power transition confront the puzzle brought to the fore in a seminal article by James Fearon: what prevents states from striking a bargain that avoids the costs of war? 18 Why can’t states renegotiate the international order as underlying capabilities distributions shift their relative bargaining power? Fearon proposed that one answer consistent with strict rational choice assumptions is that such bargains are infeasible when the issue at stake is indivisible and cannot readily be portioned out to each side. Most aspects of a given international order are readily divisible, however, and, as Fearon stressed, “both the intrinsic complexity and richness of most matters over which states negotiate and the availability of linkages and side-payments suggest that intermediate bargains typically will exist.”19 Thus, most scholars have assumed that the indivisibility problem is trivial, focusing on two other rational choice explanations for bargaining failure: uncertainty and the commitment problem.20 In the view of many scholars, it is these problems, rather than indivisibility, that likely explain leaders’ inability to avail themselves of such intermediate bargains. Yet recent research inspired by constructivism shows how issues that are physically divisible can become socially indivisible, depending on how they relate to the identities of decision makers.21 Once issues surrounding the status quo are framed in positional terms as bearing on the disputants’ relative standing, then, to the extent that they value their standing itself, they may be unwilling to pursue intermediate bargaining solutions. Once linked to status, easily divisible issues that theoretically provide opportunities for linkages and side payments of various sorts may themselves be seen as indivisible and thus unavailable as avenues for possible intermediate bargains. The historical record surrounding major wars is rich with evidence suggesting that positional concerns over status frustrate bargaining: expensive, protracted conflict over what appear to be minor issues; a propensity on the part of decision makers to frame issues in terms of relative rank even when doing so makes bargaining harder; decision-makers’ [End Page 33] inability to accept feasible divisions of the matter in dispute even when failing to do so imposes high costs; demands on the part of states for observable evidence to confirm their estimate of an improved position in the hierarchy; the inability of private bargains to resolve issues; a frequently observed compulsion for the public attainment of concessions from a higher ranked state; and stubborn resistance on the part of states to which such demands are addressed even when acquiescence entails limited material cost. The literature on bargaining failure in the context of power shifts remains inconclusive, and it is premature to take any empirical pattern as necessarily probative. Indeed, Robert Powell has recently proposed that indivisibility is not a rationalistic explanation for war after all: fully rational leaders with perfect information should prefer to settle a dispute over an indivisible issue by resorting to a lottery rather than a war certain to destroy some of the goods in dispute. What might prevent such bargaining solutions is not indivisibility itself, he argues, but rather the parties’ inability to commit to abide by any agreement in the future if they expect their relative capabilities to continue to shift.22 This is the credible commitment problem to which many theorists are now turning their attention. But how it relates to the information problem that until recently dominated the formal literature remains to be seen.23 The larger point is that positional concerns for status may help account for the puzzle of bargaining failure. In the rational choice bargaining literature, war is puzzling because it destroys some of the benefits or flows of benefits in dispute between the bargainers, who would be better off dividing the spoils without war. Yet what happens to these models if what matters for states is less the flows of material benefits themselves than their implications for relative status? The salience of this question depends on the relative importance of positional concern for status among states. Do Great Powers Care about Status? Mainstream theories generally posit that states come to blows over an international status quo only when it has implications for their security or material well-being. The guiding assumption is that a state’s satisfaction [End Page 34] with its place in the existing order is a function of the material costs and benefits implied by that status.24 By that assumption, once a state’s status in an international order ceases to affect its material wellbeing, its relative standing will have no bearing on decisions for war or peace. But the assumption is undermined by cumulative research in disciplines ranging from neuroscience and evolutionary biology to economics, anthropology, sociology, and psychology that human beings are powerfully motivated by the desire for favorable social status comparisons. This research suggests that the preference for status is a basic disposition rather than merely a strategy for attaining other goals.25 People often seek tangibles not so much because of the welfare or security they bring but because of the social status they confer. Under certain conditions, the search for status will cause people to behave in ways that directly contradict their material interest in security and/or prosperity.

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

King 11

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

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

#### DoD bypasses regulatory hurdles and safety hazards

Loudermilk 11

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

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

## desal

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

Dinar et al 10/18/12

SHLOMI DINAR is associate professor in the Department of Politics and International Relations and associate director of the School of International and Public Affairs at Florida International University. LUCIA DE STEFANO is associate professor at Complutense University of Madrid and researcher at the Water Observatory of the Botín Foundation. JAMES DUNCAN is consultant on natural resource governance and geography with the World Bank. KERSTIN STAHL is senior scientist at the Institute of Hydrology in the University of Freiburg. KENNETH M. STRZEPEK is research scientist with the Massachusetts Institute of Technology Joint Program on the Science and Policy of Global Change. AARON T. WOLF is a professor of geography in the College of Earth, Ocean, and Atmospheric Sciences at Oregon State University, Foreign Affairs, October 18, 2012, "No Wars for Water", http://www.foreignaffairs.com/articles/138208/shlomi-dinar-lucia-de-stefano-james-duncan-kerstin-stahl-kenneth/no-wars-for-water?page=show

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

#### Those wars go global

Reilly ‘2

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

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

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

#### And nuclear

Weiner ‘90

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

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

#### Water scarcity causes Central Asian war

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

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

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

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

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

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

#### Extinction

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

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

#### Water scarcity collapses Latin America

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>

As in most regions of the world, Latin America, and particularly Argentina, has an extensive coastal area with populations lacking fresh water, representing an important restriction for its socioeconomic development. Nuclear desalination is a possible solution to this ongoing scarcity. Using nuclear power to generate fresh water as well as electricity is economically preferable to energy from fossil fuels. A CAREM plant (a small reactor developed jointly by Investigaciones Aplicadas Sociedad del Estado [INVAP] and the Comisión Nacional de Energia Atómica), coupled to an RO system, is an economical and technically feasible option, as well as a safe and reliable alternative for desalination and energy production in Puerto Deseado and other cities with water scarcity problems.

#### Goes global and nuclear

Rochlin 94(James Francis, Professor of Political Science at Okanagan University College. “Discovering the Americas: the evolution of Canadian foreign policy towards Latin America,” p. 130-131)

While there were economic motivations for Canadian policy in Central America, security considerations were perhaps more important. Canada possessed an interest in promoting stability in the face of a potential decline of U.S. hegemony in the Americas. Perceptions of declining U.S. influence in the region – which had some credibility in 1979-1984 due to the wildly inequitable divisions of wealth in some U.S. client states in Latin America, in addition to political repression, under-development, mounting external debt, anti-American sentiment produced by decades of subjugation to U.S. strategic and economic interests, and so on – were linked to the prospect of **explosive events** occurring in the hemisphere. Hence, the Central American imbroglio was viewed as a fuse which could ignite a cataclysmic process throughout the region. Analysts at the time worried that in a worst-case scenario, instability created by a regional war, beginning in Central America and spreading elsewhere in Latin America, might preoccupy Washington to the extent that the United States would be unable to perform adequately its important hegemonic role in the international arena – a concern expressed by the director of research for Canada’s Standing Committee Report on Central America. It was feared that such a predicament could **generate increased global instability** and perhaps even a **hegemonic war**. This is one of the motivations which led Canada to become involved in efforts at regional conflict resolution, such as Contadora, as will be discussed in the next chapter.

#### Only SMR’s solve

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

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

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

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

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

water, sanitation and hygiene for all by 2025.

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

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

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

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

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

1.3. THE ROLE OF NUCLEAR POWER IN DESALINATION

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

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

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

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

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

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

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

1.3.1. Nuclear desalination

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

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

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

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

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

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

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

reactors (Section 1.6).

1.3.2. Why nuclear desalination?

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

Article II of the IAEA Statute provides that:

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

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

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

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

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

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

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

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

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

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

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

1.3.3. Environmental impact of desalination by fossil fuelled energy sources

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

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

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

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

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

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

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

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

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

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

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

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

13 to 264 million tonnes/year of CO2.

1350 to 1 310 000 tonnes/year of SOx.

21 100 to 540 000 tonnes/year of NOx.

1190 to 40 000 tonnes/year of particles.

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

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

#### Key to deescalate conflicts

Palley ‘11

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

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

#### It’s economically viable

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

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

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

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

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

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

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

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

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

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

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

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

#### Plan accesses a huge export market

Rosner and Goldberg 11

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

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

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

## solvency

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

Andres and Breetz 11

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

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

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

Fitzpatrick, Freed and Eyoan, 11

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

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

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

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

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

#### Prefer our econ models

Dean Glenn Hubbard 11-2, Professor of Finance and Economics at Columbia Business School, “Building small: In many industries, economies of size is shifting to economies of numbers”, <http://www.laserfocusworld.com/news/2012/11/05/building-small-in-many-industries-economies-of-size-is-shifting-to-economies-of-numbers.html>

For decades, bigger is better has been the conventional path to efficiency in industries ranging from transportation to power generation. Food once grown on small family plots now comes overwhelmingly from factory farms. Vessels that carried 2,000 tons of cargo have been replaced by modern container ships that routinely move 150,000 tons.

But now, new research shows, we are on the cusp of a radical shift from building big to building small-a change that has profound implications for both established and emerging industries. Many industry sectors are nearing or have reached a tipping point in which efficiency of unit size is being replaced by efficiency of numbers, according to a recent study by Garrett van Ryzin, the Paul M. Montrone Professor of Private Enterprise at Columbia Business School, Caner Gmen, Ph.D. candidate at Columbia Business School, and Eric Dahlgren and Klaus S. Lackner of Columbia Universitys School of Engineering and Applied Science. Rather than relying on custom-built, large-scale units of production - e.g. massive thermal power plants - industries can benefit from a shift to small, modular, mass-produced units that can be deployed in a single location or distributed across many locations - e.g. photovoltaic (PV) panels mounted on utility poles. Conventional wisdom holds that capital cost per unit of capacity decline with increasing unit size. Other efficiencies of unit size arise from manufacturers ability to spread out the fixed-costs components of production, as well as factors such as operator labor and design costs. This alternative approach to infrastructure design offers new possibilities for reducing costs and improving service, the researchers found. The authors identify three driving forces underlying this shift. First, new computing, sensor, and communication technologies make high degrees of automation possible at a very low cost, largely eliminating the labor savings from large units. Second, mass production of many small, standardized units can achieve capital cost savings comparable to or even greater than those achievable through large unit scale. And third, small-unit scale technology provides significant flexibility-a benefit that has been largely ignored in the race toward ever-increasing scale and one which can significantly reduce both investment and operating costs. This trend-observable in nascent form in several industries ranging from small, modular nuclear reactors, chlorine plants, and biomass energy systems to data centers-is resulting in a switch from large to small optimal unit scale, the authors found. The shift mirrors a similar revolution that began thirty years ago in the supercomputer industry. The traditional approach to producing higher capacity and greater speed in computing was to build increasingly powerful, specialized machines with ever-increasing processing power. This came to a halt in the mid-1990s, when it became cheaper to employ mass-produced processors and high-capacity memory from the burgeoning personal computer industry. Soon, the researchers conclude, many more industries will learn to think small and thereby reap the benefits of this new paradigm in production.

## link uq

#### DoE will massively increase SMR incentives

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### But it’s not enough

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

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

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

ANA 12

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

“While SRS may superficially appear to present certain attractive aspects for the location of SMRs, the site has not had experience with operation of nuclear reactors in over twenty years and has no current expertise § Marked 11:09 § in reactor operation,” said Clements. “While DOE is set to chose two SMR designs to fund for further development, SRS affirms that no construction funds will be provided, leaving vendors with the difficult and perhaps insurmountable task to find private funding for SMR construction.”

Two of the three separate “Memoranda of Agreement” for three different and still hypothetical SMR designs include deployment timelines which are already admitted by DOE to be inaccurate since they were signed less than six months ago.

# 2AC

## desal

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

I. Khamis, IAEA, 2009, 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).

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

Manuel Schiffler, economist in the World Bank's Middle East and North Africa Region, 2004, 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.

#### Ocean’s resilient

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

But the oceans are so incredibly big that our impact on them has been astoundingly insignificant - the oceans contain more than 1,000 billion liters of water. The UN’s overall evaluation of the oceans concludes: “The open sea is still relatively clean. Low levels of lead, synthetic compounds and artificial radionuclides, though widely detectable, are biologically insignificant. Oil slicks and litter are common among sea leans, but are, at present, a minor consequences to communities of organisms living in ocean waters.

## africa

#### They conceded an internal link to Nile war

#### Goes global

Glick 7

Caroline Glick 7, deputy managing editor of The Jerusalem Post, Senior Fellow for Middle East Affairs of the Center for Security Policy, “Condi's African holiday”, December 11, http://www.rightsidenews.com/20071211309/editorial/us-opinion-and-editorial/our-world-condis-african-holiday.html

The Horn of Africa is a dangerous and strategically vital place. Small wars, which rage continuously, can easily escalate into big wars. Local conflicts have regional and global aspects. All of the conflicts in this tinderbox, which controls shipping lanes from the Indian Ocean into the Red Sea, can potentially give rise to regional, and indeed global conflagrations between competing regional actors and global powers.

## disaster relief

#### Power outages kill disaster relief operations

Brookings and Hoover 11, The Brookings Institution Energy Security Initiative, The Hoover Institution Shultz-Stephenson Task Force on Energy Policy, “Assessing the Role of Distributed Power Systems in the U.S. Power Sector”, October, <http://media.hoover.org/sites/default/files/documents/Distributed-Energy.pdf>

The DOD has a substantial portfolio of real estate, including more than 500,000 buildings totaling nearly 2.2 billion sq. feet, approximately 3 times the total square footage occupied by the world’s WalMarts.79 Once seen simply as staging areas, bases have now become increasingly mission-critical, as was demonstrated during Hurricane Katrina, in which much of the relief effort was carried out from military bases. The Department of Homeland Security has also developed plans to have military bases be a key point of response in the event of a major terrorist incident. Given their new roles, the supply of uninterruptable, secure power to these facilities is now a necessity.80 In the view of the military, the assurance of such supply is not possible through sole reliance on the civilian power grid. As a 2008 DOD report noted: “Critical national security and Homeland defense missions are at an unacceptably high risk of extended outage from failure of the grid.”81 The report recommended that the military “reduce the risk to critical missions at fixed installations from loss of commercial power and other critical national infrastructure.” Military concerns over power disruption extend beyond bases themselves. The prospect of an extended outage to defense production equipment suppliers—either through unintentional disruption or through cyber-attacks such as that in September 2011 on Mitsubishi, the Japanese government’s largest arms supplier—present an additional serious and credible threat. Iran famously was set back for several years by the Stuxnet worm, which badly crippled Iran’s nuclear capability.82 According to senior military officials interviewed for this study, there are concerns that a similar attack in the United States could cripple Untied States military capabilities.

#### Extinction

Reiffel 5 (Lex, Brookings Institution, “Reaching Out: Americans Serving Overseas,” The Brookings Institution, [www.brookings.edu/views/papers/20051207rieffel.pdf](http://www.brookings.edu/views/papers/20051207rieffel.pdf))

The devastation of New Orleans by Hurricane Katrina at the end of August 2005 was another blow to American self-confidence as well as to its image in the rest of the world. It cracked the veneer of the society reflected in the American movies and TV programs that flood the world. It exposed weaknesses in government institutions that had been promoted for decades as models for other countries. Internal pressure to turn America’s back on the rest of the world is likely to intensify as the country focuses attention on domestic problems such as the growing number of Americans without health insurance, educational performance that is declining relative to other countries, deteriorating infrastructure, and increased dependence on foreign supplies of oil and gas. A more isolationist sentiment would reduce the ability of the USA to use its overwhelming military power to promote peaceful change in the developing countries that hold two-thirds of the world’s population and pose the gravest threats to global stability. Isolationism might heighten the sense of security in the short run, but it would put the USA at the mercy of external forces in the long run. Accordingly, one of the great challenges for the USA today is to build a broad coalition of like-minded nations and a set of international institutions capable of maintaining order and addressing global problems such as nuclear proliferation, epidemics like HIV/AIDS and avian flu, failed states like Somalia and Myanmar, and environmental degradation. The costs of acting alone or in small coalitions are now more clearly seen to be unsustainable. The limitations of “hard” instruments of foreign policy have been amply demonstrated in Iraq. Military power can dislodge a tyrant with great efficiency but cannot build stable and prosperous nations. Appropriately, the appointment of Karen Hughes as Under Secretary of State for Public Diplomacy and Public Affairs suggests that the Bush Administration is gearing up to rely more on “soft” instruments.

## k

#### Method focus causes scholarly paralysis

**Jackson**, associate professor of IR – School of International Service @ American University, **‘11**

(Patrick Thadeus, The Conduct of Inquiry in International Relations, p. 57-59)

Perhaps the greatest irony of this instrumental, decontextualized importation of “falsification” and its critics into IR is the way that an entire line of thought that privileged disconfirmation and refutation—no matter how complicated that disconfirmation and refutation was in practice—has been transformed into a license to **worry endlessly about foundational assumptions.** At the very beginning of the effort to bring terms such as “paradigm” to bear on the study of politics, Albert O. **Hirschman** (1970b, 338) **noted this very danger**, suggesting that without “a little more ‘reverence for life’ and a little less straightjacketing of the future,” the **focus on** producing internally **consistent** packages of **assumptions instead of** actually examining **complex empirical situations would result in scholarly paralysis.** Here as elsewhere, Hirschman appears to have been quite prescient, inasmuch as the major effect of paradigm and research programme language in IR seems to have been a series of debates and discussions about whether the fundamentals of a given school of thought were sufficiently “scientific” in their construction. Thus **we have debates about how to evaluate scientific progress**, and attempts to propose one or another set of research design principles **as uniquely scientific**, and inventive, “reconstructions” of IR schools, such as Patrick James’ “elaborated structural realism,” supposedly for the purpose of placing them on a **firmer scientific footing** by making sure that they have all of the required elements of a basically Lakatosian19 model of science (James 2002, 67, 98–103).

The bet with all of this scholarly activity seems to be that if we can just get the fundamentals right, then scientific progress will inevitably ensue . . . even though this is the precise opposite of what Popper and Kuhn and Lakatos argued! In fact, all of this obsessive interest in foundations and starting-points is, in form if not in content, a lot closer to logical positivism than it is to the concerns of the falsificationist philosophers, despite the prominence of language about “hypothesis testing” and the concern to formulate testable hypotheses among IR scholars engaged in these endeavors. That, above all, is why I have labeled this methodology of scholarship neopositivist. While it takes much of its self justification as a science from criticisms of logical positivism, in overall sensibility it still operates in a visibly positivist way, attempting to construct knowledge from the ground up by getting its foundations in logical order before concentrating on how claims encounter the world in terms of their theoretical implications. This is by no means to say that neopositivism is not interested in hypothesis testing; on the contrary, neopositivists are extremely concerned with testing hypotheses, but **only after the fundamentals have been** soundly **established.** Certainty, not conjectural provisionality, seems to be the goal—a goal that, ironically, Popper and Kuhn and Lakatos would all reject.

#### Alt Fails—nation state identity is inevitable and key to solving multiple scenarios for violence and war

**Calhoun 7**

(Craig, Prof of Social Science at New York University and President of the Social Science Research Council”, Nations Matter: Citizenship, Solidarity and the Cosmopolitcan Dream, p 3-7)

The idea of a nation-state is arguably pernicious. The hyphen ties the notion of a historically or naturally unified people who intrinsically belong together to that of a modern polity with unprecedented military power and capacity for effective internal administration. It has been a recipe for conflicts both internal and external. Populations straddle borders or move long distances to new states while retaining allegiances to old nations. Dominant groups demand that governments enforce cultural conformity, challenging both the individual freedom and the vitality that comes from cultural creativity. And yet, the nation-state neither can be nor should be wished away. Source of so many evils, it is also the framework in which the modern era produced history’s most enduring and successful experiments in largescale democracy. It continues to shape not just the fact of democracy but diversity in its forms (as Chapter 7 suggests). It is basic to the rule of law, not only because most law remains a domestic matter of nation-states but because most international law is literally that: structured by agreements among nation-states. Not least of all, while globalization has produced innumerable paths across state borders, it has opened these very unevenly and disproportionately to the benefit of those with access to high levels of fluid capital. Conversely, it has made belonging to a nation-state and having clear rights within a nation-state **more, not less, important.** The fact that Hannah Arendt observed more than half a century ago remains true: human rights are secured mainly when they are institutionalized as civil rights.1 In the 1990s, optimistic after the end of the Cold War, a number of enthusiasts for globalization suggested that sovereign states were obsolete. Money, media, and human migrations all flowed across borders; Why should military and political power maintain borders? States bolstered by nationalist passions – and nationalists eager to gain state power – were behind many of the twentieth century’s bloody wars. Surely there was – and remains – a good prima facie case for hoping nation-states might organize less of human loyalty, power, and conflict. And of course new reasons for hating abuses of state authority merged with ancient resentments of state power. But **it is one thing to seek limits on the exercise of state power and another to contemplate transcending it.** It is one thing to encourage a cosmopolitan pluralism of perspectives and another to regard nationalism as merely a fading inheritance and not a recurrently renewed source of solidarity. It is one thing to seek to advance global civil society and another to imagine democracy can thrive without effective states. The many evils of the late twentieth and early twenty-first centuries called forth a widespread indignation and, among many, a determination to act. The idea of human rights moved to the forefront not only of discussion but of court cases and treaties. Humanitarian interventions were proposed and implemented in a widening range of circumstances. Ethnic cleansing and genocidal nationalism made the notion that sovereignty should be a barrier to international efforts to do good ring hollow. An international criminal court was created (if not universally recognized). Indeed for a time there seemed no occupation more virtuous than that of a human rights activist or humanitarian aid worker. Almost imperceptibly these shifted from volunteer pursuits and accidental careers for physicians and pacifists to new professional roles, complete with academic courses and credentials, funding from major foundations and national governments, and increasing bureaucracy. And humanitarian action became increasingly intertwined with military interventions, whether for peacekeeping or regime change. At the same time, protesters challenged the dominance of capitalist corporations over the course of globalization. This was misleadingly termed the anti-globalization movement. Though there were some campaigners truly bent on enhancing the autonomy of local populations, most were actually proponents of a different sort of globalization. They objected to environmental depredation, sweatshops, and high prices for necessary drugs but they worked on a global scale and imagined the world in terms of global connections – albeit connections among ordinary people without the powerful mediation of corporations and states. The movement contesting capitalist globalization has not been theory-driven, but its protagonists have shared a general account of the problems of the world in which the twin centers of power – capitalist corporations and nation-states – pursue a logic of self-aggrandizement that neither the natural world nor its human inhabitants can afford. Many have found the language of Michael Hardt and Antonio Negri sympathetic: they represent the heterogeneous “multitude” of the world who struggled to be free of a seamless and destructive but nearly exhausted “empire.”2 Something of the same quasi-theory – that states and corporations are both bad and unnecessary – has been widespread among human rights activists and humanitarian aid workers. Both groups, of course, saw first hand the vicious ways in which state elites pursued or held on to power and firms sought or sustained profits. The Sudan is one of the largest scale and longest-lasting examples. Its central government has seldom cared much for the people of Darfur in its west, the non-Arabs of its south, or for that matter most ordinary Sudanese. But the central government has cared about holding the country together and defeating any secessionist movements. It cared all the more when oil was discovered in the south – as did global corporations seeking to extract that oil in “peace.” And it cared all the more when it took on a more pronounced Islamic identity and mission. Despite religious commitment (and partly because of intra-Islamist struggles), it became a peculiarly bad government, but also one too weak to establish peace or prosperity in the Sudan; it unleashed brutal war and civil violence against and among its own people. So there were refugees and internally displaced people, rape as a tactic of war, robber militias, and spreading diseases left untreated. The state did not look very good. Yet by the beginning of the twenty-first century, there were not many left for whom the **fantasy** of overcoming the state was not tinged with anxiety. Yes, state power was often overweaning, often corrupt, and often mobilized in evil ways. But weak states typically failed their citizens and crises in strong states often unleashed violence and disrupted both lives and livelihoods. Pandemic diseases, global crime, human rights abuses, and forced migration all revealed the dark side to globalization – yet all seemed to call at least in part for better states, not an end to states. Could outsiders make peace in Sudan or would that depend on a more representative, honest, and competent Sudanese government? Or in a range of other African countries, could outside interventions contain the spread of AIDS unless states joined the struggle? And yet, partly because of structural adjustment programs pushed with fiscal good intentions and disastrous human consequences by the World Bank and others, most African states had neither money nor personnel nor health care systems to address AIDS – or for that matter malaria and other diseases. The “failed state” seemed as problematic as the abusive state. And this was not only an issue in Africa but in different local configurations around the world. A great buzzword of the 1990s was “civil society” (see Chapter 4). And indeed, strengthening civil society – loose institutions part neither of the state nor of large-scale projects of capital accumulation – has been an important trend in many places. Both local and transnational voluntary organizations have grown and played crucial roles. Many are religiously inspired and some denominationally organized. Others are secular. All reflect efforts to create social organization on the basis of voluntary relations among people rather than the coercion of either political authority or capital. And yet, civil society organizations depend on money as well as personal connections. And except where states are able to regulate such organizations they are largely unaccountable and nontransparent. Civil society without a public sphere is not necessarily democratic. Civil society is a hugely valuable complement and sometimes corrective to states and markets, but not a substitute for either.3 It is no accident that “global governance” has become almost as ubiquitous a concern in the current decade as global civil society was in the last. But the issues are not only global; they are also national and local. Intermediate powers and solidarities still matter. Individual sovereign states confront a variety of global flows and processes against which they are weak and which in turn weaken some of their other capacities. Global currency and equity markets make it hard for individual countries to operate autonomous fiscal or industrial policies. Global crime is hard to fight with the tools of national legal systems (and especially their domestic criminal law). Global diseases challenge domestic health care systems. Yet these challenges faced by contemporary states no more make them irrelevant than the history of abuses of state power makes the stability and public services states can deliver unimportant. And crucially, most actually existing democracy has been achieved in and through states.

#### Nuclear technocracy’s key to solve

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

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

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

#### Violence is declining

Steven **Pinker 11**, professor of psychology at Harvard, The Better Angels of our Nature, October, googlebooks

This book is about what may be the most important thing that has ever happened in human history. Believe it or not—and I know that most people do not—**violence has declined over long stretches of time, and today we may be living in the most peaceable era in our species’ existence**. **The decline**, to be sure, **has not been smooth; it has not brought violence down to zero; and it is not guaranteed to continue. But it is an unmistakable development**, **visible on scales from millennia to years**, from the waging of wars to the spanking of children. **No aspect of life is untouched by the retreat from violence**. Daily existence is very different if you always have to worry about being abducted, raped, or killed, and it’s hard to develop sophisticated arts, learning, or commerce if the institutions that support them are looted and burned as quickly as they are built. The historical trajectory of violence affects not only how life is lived but how it is understood. What could be more fundamental to our sense of meaning and purpose than a conception of whether the strivings of the human race over long stretches of time have left us better or worse off? **How**, in particular, **are we to make sense of modernity**—of the erosion of family, tribe, tradition, and religion by the forces of individualism, cosmopolitanism, reason, and science? So **much depends on how we understand the legacy of this transition: whether we see our world as a nightmare** of crime, terrorism, genocide, and war, **or as a period that, by the standards of history, is blessed by unprecedented levels of peaceful coexistence**. **The question of whether the arithmetic sign of trends in violence is positive or negative also bears on our conception of human nature**. Though theories of human nature rooted in biology are often associated with fatalism about violence, and the theory that the mind is a blank slate is associated with progress, in my view it is the other way around. How are we to understand the natural state of life when our species first emerged and the processes of history began? The belief that violence has increased suggests that the world we made has contaminated us, perhaps irretrievably. The belief that it has decreased suggests that we started off nasty and that the artifices of civilization have moved us in a noble direction, one in which we can hope to continue. This is a big book, but it has to be. First I have to convince you that **violence really has gone down over the course of history**, knowing that **the very idea invites skepticism, incredulity, and** sometimes **anger**. **Our cognitive faculties predispose us to believe that we live in violent times**, **especially when they are stoked by media** that follow the watchword “If it bleeds, it leads.” **The human mind tends to estimate the probability of an event from the ease with which it can recall examples, and scenes of carnage are more likely to be beamed into our homes and burned into our memories than footage of people dying of old age**.1 **No matter how small the percentage of violent deaths may be, in absolute numbers there will always be enough of them to fill the evening news, so people’s impressions of violence will be disconnected from the actual proportions**. Also distorting our sense of danger is our moral psychology. **No one has ever recruited activists to a cause by announcing that things are getting better, and bearers of good news are often advised to keep their mouths shut lest they lull people into complacency**. Also, **a large swath of our intellectual culture is loath to admit that there could be anything good about civilization, modernity, and Western society**. But perhaps the main cause of the illusion of ever-present violence springs from one of the forces that drove violence down in the first place. **The decline of violent behavior has been paralleled by a decline in attitudes that tolerate or glorify violence, and often the attitudes are in the lead**. By the standards of the mass atrocities of human history, the lethal injection of a murderer in Texas, or an occasional hate crime in which a member of an ethnic minority is intimidated by hooligans, is pretty mild stuff. But from a contemporary vantage point, we see them as signs of how low our behavior can sink, not of how high our standards have risen. In the teeth of these preconceptions, I will have to persuade you with numbers, which I will glean from datasets and depict in graphs. In each case I’ll explain where the numbers came from and do my best to interpret the ways they fall into place. The problem I have set out to understand is the reduction in violence at many scales—in the family, in the neighborhood, between tribes and other armed factions, and among major nations and states. If the history of violence at each level of granularity had an idiosyncratic trajectory, each would belong in a separate book. But to my repeated astonishment, **the global trends** in almost all of them, **viewed from the vantage point of the present, point downward**. That calls for documenting the various trends between a single pair of covers, and seeking commonalities in when, how, and why they have occurred. **Too many kinds of violence**, I hope to convince you, **have moved in the same direction for it all to be a coincidence**, and that calls for an explanation. It is natural to recount the history of violence as a moral saga—a heroic struggle of justice against evil—but that is not my starting point. My approach is scientific in the broad sense of seeking explanations for why things happen. We may discover that a particular advance in peacefulness was brought about by moral entrepreneurs and their movements. But we may also discover that the explanation is more prosaic, like a change in technology, governance, commerce, or knowledge. **Nor can we understand the decline of violence as an unstoppable force for progress that is carrying us toward an omega point of perfect peace. It is a collection of statistical trends** in the behavior of groups of humans in various epochs, and as such it calls for an explanation in terms of psychology and history: how human minds deal with changing circumstances.

## greenwashing

Warming won’t cause extinction

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

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

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

#### No link

Auden Schendler, Vice President of sustainability at Aspen Skiing Company, October 2007, When Being Green Backfires, Harvard Business Review, Vol. 85, Issue 10

In the past two years, companies have battled to outdo one another in their high-profile purchases of certificates symbolizing "green" electricity produced by wind, solar power, and other carbon-free, climate-friendly means. The problem is that the buying spree, meant to burnish companies' green credentials, may end up tarnishing them.

Consider this: In January 2006, Whole Foods announced the purchase of renewable energy certificates (RECs) representing the production of 458,000 megawatt hours' (MWh) worth of green electricity but was soon trumped by Wells Fargo, which bought 550,000 worth. Then Pepsi surged ahead last April with an unprecedented 1.1 million MWh REC purchase. The companies trumpeted their purchases with claims that they "offset" or, in effect, neutralized some of their carbon emissions. I made similar claims when my own company purchased RECs.

Anytime there's a feeding frenzy, you have to ask, What's so tasty? Why are businesses falling over one another to buy these pieces of paper? Printed by producers of energy each time they generate clean electricity--and then sold to hungry buyers--the certificates merely symbolize green energy. (For more, see the box "How Do Renewable Energy Certificates Work?")

Most businesses will say they're buying RECs because they care about the environment and climate change. Fair enough. But for many, buying RECs is a relatively inexpensive way to make a powerful brand-positioning statement. In one stroke, a business can don the environmental mantle, seemingly legitimately and at an affordable price, without having to directly and expensively do anything to reduce carbon emissions. Certainly, corporate reputations have been enhanced by large REC purchases.

The danger in buying RECs is that the mainstream press has begun to challenge claims about their environmental value. Articles have appeared in publications including BusinessWeek and the Financial Times pointing out that most RECs don't actually offset emissions, and the skepticism is spreading across the Internet. Indeed, most RECs don't result in the creation of clean electricity, which would have been generated anyway, whether or not an REC was printed. As consumers become increasingly savvy about evaluating companies' environmental claims, businesses that tout REC purchases may expose themselves to charges of greenwashing.

A report released in 2006 by an environmental organization called Clean Air--Cool Planet was among the first to rigorously examine the environmental impact of RECs. The report found that while most RECs don't lead to carbon-emissions reductions, a minority do, by directly helping to finance, say, the construction of a new wind farm. Companies that buy RECs and want to avoid charges of greenwashing should seek out these higher-quality and more costly certificates, whose purchase directly and demonstrably helps reduce carbon emissions.

RECs, supporters argue, create a market mechanism that spurs the development of new wind, solar, and other green-electricity plants. As demand for RECs grows, their prices will rise, encouraging developers to build more renewable power facilities that can generate income through increasingly profitable sales of the certificates. Unfortunately, because there has been such a surplus of cheap RECs--and no easy way to distinguish between high- and low-quality offerings--the market mechanism has remained stalled for the most part. If companies, mindful of their reputations, reject inferior RECs and begin demanding quality ones, that could jump-start the production of renewable electricity and actually reduce carbon emissions. Corporate scrutiny and activism might even foster the development of a badly needed tool that could clean up the entire REC industry in one masterstroke: a third-party gold standard for REC quality.

#### More ev

Laura Horton 11, J.D., Golden Gate University School of Law, Spring 2011, “COMMENT: FUTURE FORCE SUSTAINABILITY: DEPARTMENT OF DEFENSE AND ENERGY EFFICIENCY IN A CHANGING CLIMATE,” Golden Gate University Environmental Law Journal, 4 Golden Gate U. Envtl. L.J. 303, p. lexis

‘

As the world's largest consumer of energy, the military has a long way to go if it intends to achieve energy efficiency goals set by the government and the DOD itself. However, not everyone is convinced that the military will follow through, considering its past environmental record. n153 This skepticism is valid in light of the growing impact climate change has had on the planet and the extent to which the military has contributed to GHG emissions. n154 In addition, mistrust of the DOD's environmental record is warranted, since environmental damage from military activities still exists all over the United States n155

The suspect attitude toward military greening is akin to an attitude held by many concerning corporate "environmentalism" in the form of "greenwashing." n156 The military is claiming to go "green," and is indeed making strides in energy efficiency, while simultaneously increasing oil use by 1.5% annually through 2017. n157 Also, efficiency programs are limited to base installations and are not applied to tactical fleets, where much of the DOD's fuel consumption occurs. n158 Furthermore, little is said in any of the aforementioned reports about the many exemptions the DOD sought from numerous environmental laws over the past eight years. n159 The military is accustomed to approaching environmental protection on its own terms and is giving mixed signals about how [\*322] important energy efficiency will be in the near future. Consequently, there is a question as to how self-imposed standards such as voluntary compliance with federal energy efficiency standards, from which the DOD is otherwise exempt, will play out. n160 One example of the uncertainty of these programs can be found in a recent article in ClimateWire. n161 According to the article, the aforementioned spray foam insulation program has now been halted in the absence of advocacy for such programs. n162 The difficulty of relocating the foam tents and high disposal costs have led to the demise of spray foam use, and supporters are calling for a mandate to move forward with the project. n163 It is unclear whether the DOD will resume the program at all. The need for advocacy is especially important for the public to understand, because of the potential for new energy technology to transform the civilian marketplace as military technology finds its way into the public domain. n164

The military has begun to take the lead in energy efficiency, drive the civilian sector toward sustainable energy use, and push for "policy change to help make the necessary cultural shifts in how its people think about energy use and the decisions they make in all settings." n165 The more seriously the military takes energy efficiency, the faster sustainable technology will reach the public. For that reason, progress on these efforts should be monitored and documented for the public to review. A history of military brush-offs of the importance of environmental protection does not lend itself to a campaign of global stewardship. In order to win the confidence of the public, the military must demonstrate a willingness to follow through with the programs it has set in place to lead alternative-energy development in the United States and the world.

IV. Looking Ahead - The Staying Power of DOD Energy Efficiency Efforts

## cp

#### Perm – Do the CP

#### 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.

#### 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.

#### 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.

# 1AR

## impact

#### Violence is proximately caused – root cause logic is wrong

**Sharpe**, lecturer, philosophy and psychoanalytic studies, and Goucher, senior lecturer, literary and psychoanalytic studies – Deakin University, **‘10**

(Matthew and Geoff, Žižek and Politics: An Introduction, p. 231 – 233)

We realise that this argument, which we propose as a new ‘quilting’ framework to explain Žižek’s theoretical oscillations and political prescriptions, raises some large issues of its own. While this is not the place to further that discussion, we think its analytic force leads into a much wider critique of ‘Theory’ in parts of the latertwentieth- century academy, which emerged following the ‘cultural turn’ of the 1960s and 1970s in the wake of the collapse of Marxism. Žižek’s paradigm to try to generate all his theory of culture, subjectivity, ideology, politics and religion is psychoanalysis. But a similar criticism would apply, for instance, to theorists who feel that the method Jacques Derrida developed for criticising philosophical texts can meaningfully supplant the methodologies of political science, philosophy, economics, sociology and so forth, when it comes to thinking about ‘the political’. Or, differently, thinkers who opt for Deleuze (or Deleuze’s and Guattari’s) Nietzschean Spinozism as a new metaphysics to explain ethics, politics, aesthetics, ontology and so forth, seem to us candidates for the same type of **criticism, as a reductive passing over** the **empirical and analytic distinctness of** the **different** object **fields in complex societies.**

In truth, we feel that Theory, and the continuing line of ‘master thinkers’ who regularly appear particularly in the English- speaking world, is the last gasp of what used to be called First Philosophy. The philosopher ascends out of the city, Plato tells us, from whence she can espie the Higher Truth, which she must then bring back down to political earth. From outside the city, we can well imagine that she can see much more widely than her benighted political contemporaries. But from these philosophical heights, we can equally suspect that the ‘master thinker’ is also **always in danger of passing over** the **salient differences** and features of political life – differences only too evident to people ‘on the ground’. Political life, after all, is always a more complex affair than a bunch of ideologically duped fools staring at and enacting a wall (or ‘politically correct screen’) of ideologically produced illusions, from Plato’s timeless cave allegory to Žižek’s theory of ideology.

We know that Theory largely understands itself as avowedly ‘post- metaphysical’. It aims to erect its new claims on the gravestone of First Philosophy as the West has known it. But it also tells us that people very often do not know what they do. And so it seems to us that too many of its proponents and their followers are mourners who remain in the graveyard, propping up the gravestone of Western philosophy under the sign of some totalising account of absolutely everything – enjoyment, différance, biopower . . . Perhaps the time has come, we would argue, less for one more would- be global, allpurpose existential and political Theory than for a **multi- dimensional and interdisciplinary** critical **theory** that would challenge the chaotic specialisation neoliberalism speeds up in academe, which mirrors and accelerates the splintering of the Left over the last four decades. This would mean that we would have to shun the hope that one method, one perspective, or one master thinker could single- handedly decipher all the complexity of socio- political life, the concerns of really existing social movements – which specifi cally does not mean mindlessly celebrating difference, marginalisation and multiplicity as if they could be suffi cient ends for a new politics. **It would be to reopen critical theory and non- analytic philosophy to the other intellectual disciplines**, most of **whom** today **pointedly reject Theory’s legitimacy,** neither reading it nor taking it seriously.

#### Their impact is wrong – debate over even the most technical issues improves decision-making and advocacy

**Hager**, professor of political science – Bryn Mawr College, **‘92**

(Carol J., “Democratizing Technology: Citizen & State in West German Energy Politics, 1974-1990” *Polity*, Vol. 25, No. 1, p. 45-70)

What is the role of the citizen in the modern technological state? As political decisions increasingly involve complex technological choices, does a citizen's ability to participate in **decision making** diminish? These questions, long a part of theoretical discourse, gained new salience with the rise of **grassroots environmental protest in advanced industrial states.** In West Germany, where a strong environmental movement arose in the 1970s, protest has centered as much on questions of democracy as it has on public policy. Grassroots groups challenged not only the construction of large technological projects, especially power plants, but also the **legitimacy of the bureaucratic institutions** which produced those projects. Policy studies generally ignore the legitimation aspects of public policy making.2 A discussion of both dimensions, however, is crucial for understanding the significance of grassroots protest for West German political development in the technological age and for assessing the likely direction of citizen politics in united Germany. In the field of energy politics, West German citizen initiative groups tried to politicize and ultimately to democratize policy making.3 The **technicality** **of the issue** **was not a barrier** to their participation. On the contrary, **grassroots groups proved to be able participants in technical energy debate, often proposing innovative solutions to technological problems.** Ultimately, however, they wanted not to become an elite of "counterexperts," but **to create a political discourse between policy makers and citizens** through which the **goals of energy policy could be recast** and its legitimacy restored. Only a deliberative, expressly democratic form of policy making, they argued, could enjoy the support of the populace. To this end, protest groups developed new, grassroots democratic forms of decision making within their own organizations, which they then tried to transfer to the political system at large. The legacy of grassroots **energy protest in West Germany** is twofold. First, it **produced major substantive changes in public policy.** Informed citizen pressure was largely responsible for the introduction of new plant and pollution control technologies. Second, grassroots protest **undermined** the **legitimacy** of bureaucratic experts. Yet, an acceptable forum for a broadened political discussion of energy issues has not been found; the energy debate has taken place largely outside the established political institutions. Thus, the legitimation issue remains unresolved. It is likely to reemerge as Germany deals with the problems of the former German Democratic Republic. Nevertheless, an evolving ideology of citizen participationa vision of "technological democracy"-is an important outcome of grassroots action.

#### No lashout

**Kaufman**, Prof Poli Sci and IR – U Delaware, **‘9**

(Stuart J, “Narratives and Symbols in Violent Mobilization: The Palestinian-Israeli Case,” *Security Studies* 18:3, 400 – 434)

Even when hostile narratives, group fears, and opportunity are strongly present, war occurs **only if these factors are harnessed.** Ethnic narratives and fears must combine to create significant ethnic hostility among mass publics. Politicians must also seize the opportunity to manipulate that hostility, evoking hostile narratives and symbols to gain or hold power by riding a wave of chauvinist mobilization. Such mobilization is often spurred by prominent events (for example, episodes of violence) that increase feelings of hostility and make chauvinist appeals seem timely. If the other group also mobilizes and if each side's felt security needs threaten the security of the other side, the result is a security dilemma spiral of rising fear, hostility, and mutual threat that results in violence. **A virtue of** this **symbolist theory is that symbolist logic explains why** ethnic **peace is more common than ethnonationalist war.** Even if hostile narratives, fears, and opportunity exist, severe violence usually can still be avoided if ethnic elites skillfully define group needs in moderate ways and collaborate across group lines to prevent violence: this is consociationalism.17 War is likely only if hostile narratives, fears, and opportunity spur hostile attitudes, chauvinist mobilization, and a security dilemma.

## 1ar epistemology

#### Their alt ev says that interrogating knowledge would allow the nuclear scholarship movements to emerge—that’s empirically denied

**Wendt**, professor of international security – Ohio State University, **‘98**

(Alexander, “On Constitution and Causation in International Relations,” British International Studies Association)

As a community, we in the academic study of international politics spend too much time worrying about the kind of issues addressed in this essay. The **central point** of IR scholarship is to increase our knowledge of how the world works, not to worry about how (or whether) we can know how the world works. What matters for IR is ontology, not epistemology. This doesn’t mean that there are no interesting epistemological questions in IR, and even less does it mean that there are no important political or sociological aspects to those questions. Indeed there are, as I have suggested above, and as a discipline IR should have more awareness of these aspects. At the same time, however, these are questions best addressed by philosophers and sociologists of knowledge, not political scientists. Let’s face it: most IR scholars, including this one, have little or no proper training in epistemology, and as such the attempt to solve epistemological problems anyway will **inevitably lead to confusion** (after all, **after 2000 years, even** the **specialists are still having a hard time**). Moreover, as long as we let our research be driven in an open-minded fashion by substantive questions and problems rather than by epistemologies and methods, there is little need to answer epistemological questions either. It is simply not the case that we have to undertake an epistemological analysis of how we can know something before we can know it, a fact amply attested to by the success of the natural sciences, whose practitioners are only rarely forced by the results of their inquiries to consider epistemological questions. In important respects we do know how international politics works, and it doesn’t much matter how we came to that knowledge. In that light, going into the epistemology business will distract us from the real business of IR, which is international politics. **Our great debates should be about first-order issues of substance**, like the ‘first debate’ between Realists and Idealists, **not second-order issues of method.**

Unfortunately, it is no longer a simple matter for IR scholars to ‘just say no’ to epistemological discourse. The problem is that this discourse has already contaminated our thinking about international politics, helping to polarize the discipline into ‘**paradigm wars’**. Although the resurgence of these wars in the 1980s and 90s is due in large part to the rise of post-positivism, its roots lie in the epistemological anxiety of positivists, who since the 1950s have been very concerned to establish the authority of their work as Science. This is an important goal, one that I share, but its implementation has been marred by an overly narrow conception of science as being concerned only with causal questions that can be answered using the methods of natural science. The effect has been to marginalize historical and interpretive work that does not fit this mould, and to encourage scholars interested in that kind of work to see themselves as somehow not engaged in science. One has to wonder whether the two sides should be happy with the result. Do positivists really mean to suggest that it is not part of science to ask questions about how things are constituted, questions which if those things happen to be made of ideas might only be answerable by interpretive methods? If so, then they seem to be saying that the double-helix model of DNA, and perhaps much of rational choice theory, is not science. And do post-positivists really mean to suggest that students of social life should not ask causal questions or attempt to test their claims against empirical evidence? If so, then it is **not clear by what criteria their work should be judged**, **or how it differs from art or revelation**. On both sides, in other words, the result of the Third Debate’s **sparring over epistemology is often one-sided, intolerant caricatures** of science.

Broad indicts of epistemology don’t take out our impacts – you should weigh **specific evidence** to get closer to the truth

**Kratochwil**, professor of international relations – European University Institute, **‘8**

(Friedrich, “The Puzzles of Politics,” pg. 200-213)

In what follows, I claim that the shift in focus from “demonstration” to science as practice provides strong prima facie reasons to choose pragmatic rather than traditional epistemological criteria in social analysis.

Irrespective of its various forms, the epistemological project includes an argument that all warranted knowledge has to satisfy certain field- independent criteria that are specified by philosophy (a “theory of know- ledge”). The real issue of how our concepts and the world relate to each other, and on which non-idiosyncratic grounds we are justified to hold on to our beliefs about the world, is “answered” by two metaphors. The first is that of an inconvertible ground, be it the nature of things, certain intuitions (Des- cartes’ “clear and distinct ideas”) or methods and inferences; the second is that of a “mirror” that shows what is the case.

There is no need to rehearse the arguments demonstrating that these under- lying beliefs and metaphors could not sustain the weight placed upon them. A “method” à la Descartes could not make good on its claims, as it depended ultimately on the guarantee of God that concepts and things in the outer world match. On the other hand, the empiricist belief in direct observation forgot that “facts” which become “data” are – as the term suggests – “made”. They are based on the judgements of the observer using cultural criteria, even if they appear to be based on direct perception, as is the case with colours.4

Besides, there had always been a sneaking suspicion that the epistemo- logical ideal of certainty and rigour did not quite fit the social world, an objection voiced first by humanists such as Vico, and later rehearsed in the continuing controversies about erklären and verstehen (Weber 1991; for a more recent treatment see Hollis 1994). In short, both the constitutive nature of our concepts, and the value interest in which they are embedded, raise peculiar issues of meaning and contestation that are quite different from those of description. As Vico (1947) suggested, we “understand” the social world because we have “made it”, a point raised again by Searle concerning both the crucial role played by ascriptions of meaning (x counts for y) in the social world and the distinction between institutional “facts” from “brute” or natural facts (Searle 1995). Similarly, since values are constitutive for our “interests”, the concepts we use always portray an action from a certain point of view; this involves appraisals and prevents us from accepting allegedly “neutral” descriptions that would be meaningless. Thus, when we say that someone “abandoned” another person and hence communicate a (contestable) appraisal, we want to call attention to certain important moral implica- tions of an act. Attempting to eliminate the value-tinge in the description and insisting that everything has to be cast in neutral, “objective”, observational language – such as “he opened the door and went through it” – would indeed make the statement “pointless”, even if it is (trivially) “true” (for a powerful statement of this point, see Connolly 1983).

The most devastating attack on the epistemological project, however, came from the history of science itself. It not only corrected the naive view of knowledge generation as mere accumulation of data, but it also cast increasing doubt on the viability of various field-independent “demarcation criteria”. This was, for the most part, derived from the old Humean argument that only sentences with empirical content were “meaningful”, while value statements had to be taken either as statements about individual preferences or as meaningless, since de gustibus non est disputandum. As the later dis- cussion in the Vienna circle showed, this distinction was utterly unhelpful (Popper 1965: ch. 2). It did not solve the problem of induction, and failed to acknowledge that not all meaningful theoretical sentences must correspond with natural facts.

Karl Popper’s ingenious solution of making “refutability” the logical cri- terion and interpreting empirical “tests” as a special mode of deduction (rather than as a way of increasing supporting evidence) seemed to respond to this epistemological quandary for a while. An “historical reconstruction” of science as a progressive development thus seemed possible, as did the specification of a pragmatic criterion for conducting research.

Yet again, studies in the history of science undermined both hopes. The different stages in Popper’s own intellectual development are, in fact, rather telling. He started out with a version of conjectures and refutations that was based on the notion of a more or less self-correcting demonstration. Con- fronted with the findings that scientists did not use the refutation criterion in their research, he emphasised then the role of the scientific community on which the task of “refutation” devolved. Since the individual scientist might not be ready to bite the bullet and admit that she or he might have been wrong, colleagues had to keep him or her honest. Finally, towards the end of his life, Popper began to rely less and less on the stock of knowledge or on the scientists’ shared theoretical understandings – simply devalued as the “myth of the framework” – and emphasised instead the processes of communica- tion and of “translation” among different schools of thought within a scien- tific community (Popper 1994). He still argued that these processes follow the pattern of “conjecture and refutation”, but the model was clearly no longer that of logic or of scientific demonstration, but one that he derived from his social theory – from his advocacy of an “open society” (Popper 1966). Thus a near total reversal of the ideal of knowledge had occurred. While formerly everything was measured in terms of the epistemological ideal derived from logic and physics, “knowledge” was now the result of deliberation and of certain procedural notions for assessing competing knowledge claims. Politics and law, rather than physics, now provided the template.

Thus the history of science has gradually moved away from the epistemo- logical ideal to focus increasingly on the actual practices of various scientific communities engaged in knowledge production, particularly on how they handle problems of scientific disagreement.5 This reorientation implied a move away from field-independent criteria and from the demonstrative ideal to one in which “**arguments” and the “weight” of evidence had to be appraised**. This, in turn, not only generated a bourgeoning field of “science studies” and their “social” epistemologies (see Fuller 1991), but also suggested more generally that the traditional understandings of knowledge production based on the model of “theory” were in need of revision.

If the history of **science** therefore **provides strong reasons for a pragmatic turn**, as the discussion above illustrates, what remains to be shown is how this turn relates to the historical, linguistic and constructivist turns that preceded it. To start with, from the above it should be clear that, in the social world, we are not dealing with natural kinds that exist and are awaiting, so to speak, prepackaged, their placement in the appropriate box. The objects we investi- gate are rather conceptual creations and they are intrinsically linked to the language through which the social world is constituted. Here “constructivists”, particularly those influenced by Wittgenstein and language philosophy, easily link up with “pragmatists” such as Rorty, who emphasises the product- ive and pragmatic role of “vocabularies” rather than conceiving of language as a “mirror of nature” (Rorty 1979).

Furthermore, precisely because social facts are not natural, but have to be reproduced through the actions of agents, any attempt to treat them like “brute” facts becomes doubly problematic. For one, even “natural” facts are not simply “there”; they are interpretations based on our theories. Secondly, different from the observation of natural facts, in which perceptions address a “thing” through a conceptually mediated form, social reality is entirely “arti- ficial” in the sense that it is dependent on the beliefs and practices of the actors themselves. This reproductive process, directed by norms, always engenders change either interstitially, when change is small-scale or adaptive – or more dramatically, when it becomes “transformative” – for instance when it produces a new system configuration, as after the advent of national- ism (Lapid and Kratochwil 1995) or after the demise of the Soviet Union (Koslowski and Kratochwil 1994). Consequently, any examination of the social world has to become in a way “historical” even if some “structuralist” theories attempt to minimise this dimension. [. . .]

**Therefore a pragmatic approach to social science and IR seems both necessary and promising**. On the one hand, it is substantiated by the failure of the epistemological project that has long dominated the field. On the other, it offers a **different positive heuristics** that challenges IR’s traditional disciplin- ary boundaries and methodological assumptions. Interest in pragmatism therefore does not seem to be just a passing fad – even if such an interpre- tation cannot entirely be discounted, given the incentives of academia to find, just like advertising agencies, “new and improved” versions of familiar products.

## technocracy

#### Engagement with technocracy is more effective than passive rejection

**Jiménez-Aleixandre**, professor of education – University of Santiago de Compostela, and Pereiro-Muñoz High School Castelao, Vigo (Spain), **‘2**

(Maria-Pilar and Cristina, “Knowledge producers or knowledge consumers? Argumentation and decision making about environmental management,” International Journal of Science Education Vol. 24, No. 11, p. 1171–1190)

If science education and environmental education have as a goal to develop **critical thinking and** to promote **decision making**, it seems that the acknowledgement of a variety of experts and expertise is of relevance to both. **Otherwise citizens could be unable to challenge a common view** that places economical issues and technical features over other types of values or concerns. As McGinn and Roth (1999) argue, citizens should be prepared to participate in scientific practice, to be involved in situations where science is, if not created, at least used. The assessment of environmental management is, in our opinion, one of these, and citizens do not need to possess all the technical knowledge to be able to examine the positive and negative impacts and to weigh them up. The identification of instances of scientific practice in classroom discourse is difficult especially if this practice is viewed as a complex process, not as fixed ‘steps’. Several instances were identified when it could be said that students acted as a knowledge-producing community in spite of the fact that the students, particularly at the beginning of the sequence, expressed doubts about their capacities to assess a project written by experts and endorsed by a government office. Perhaps these doubts relate to the nature of the project, a ‘real life’ object that made its way into the classroom, into the ‘school life’. As Brown et al. (1989) point out, there is usually a difference between practitioners’ tasks and stereotyped school tasks and, it could be added, students are not used to being confronted with the complexity of ‘life-size’ problems. However, as the sequence proceeded, **the students assumed the role of experts**, exposing inconsistencies in the project, offering alternatives and discussing it with one of its authors. The issue of expertise is worthy of attention and it needs to be explored in different contexts where the relationships among technical expertise, values hierarchies and possible biases caused by the subject matter could be unravelled. One of the objectives of environmental education is to **empower people with the capacity of decision making**; for this purpose the acknowledging of multiple expertise is crucial.

#### Policies matter – effective energy choices depend on technical political literacy

**Hodson**, professor of education – Ontario Institute for Studies @ University of Toronto, **‘10**

(Derek, “Science Education as a Call to Action,” Canadian Journal of Science, Mathematics and Technology Education, Vol. 10, Issue 3, p. 197-206)

\*\*note: SSI = socioscientific issues

The final (fourth) level of sophistication in this issues-based approach is concerned with students findings ways of putting their values and convictions into action, helping them to prepare for and engage in responsible action, and assisting them in **developing the skills**, attitudes, and values **that will enable them to** take control of their lives, **cooperate with others to bring about change**, and work toward a more just and sustainable world in which power, wealth, and resources are more equitably shared. Socially and environmentally responsible behavior will not necessarily follow from knowledge of key concepts and possession of the “right attitudes.” As Curtin (1991) reminded us, it is important to distinguish between caring about and caring for. It is almost always much easier to proclaim that one cares about an issue than to do something about it. Put simply, our values are worth nothing until we live them. Rhetoric and espoused values will not bring about social justice and will not save the planet. We must change our actions. A politicized ethic of care (caring for) entails active involvement in a local manifestation of a particular problem or issue, exploration of the complex sociopolitical contexts in which the problem/issue is located, and attempts to resolve conflicts of interest. FROM STSE RHETORIC TO SOCIOPOLITICAL ACTION Writing from the perspective of environmental education, Jensen (2002) categorized the **knowledge** that is **likely to promote sociopolitical action** and encourage pro-environmental behavior into four dimensions: (a) **scientific and technological knowledge** that informs the issue or problem; (b) knowledge about the underlying social, political, and economic issues, conditions, and structures and how they contribute to creating social and environmental problems; (c) knowledge about how to bring about changes in society through direct or indirect action; and (d) knowledge about the likely outcome or direction of possible actions and the **desirability of those outcomes.** Although formulated as a model for environmental education, it is reasonable to suppose that Jensen's arguments are applicable to all forms of SSI-oriented action. Little needs to be said about dimensions 1 and 2 in Jensen's framework beyond the discussion earlier in the article. With regard to dimension 3, students need knowledge of actions that are likely to have positive impact and knowledge of how to engage in them. **It is essential** that they gain robust knowledge of the social, legal, and **political system(s)** that prevail in the communities in which they live and develop a clear understanding of how **decisions** are **made within** local, regional, and **national government** and within industry, commerce, and the military. Without knowledge of where and with whom power of decision making is located and awareness of the **mechanisms by which decisions are reached**, **intervention is not possible.** Thus, the curriculum I propose requires a concurrent program designed to achieve a measure of political literacy, including knowledge of how to engage in collective action with individuals who have different competencies, backgrounds, and attitudes but share a common interest in a particular SSI. Dimension 3 also includes knowledge of likely sympathizers and potential allies and strategies for encouraging cooperative action and group interventions. What Jensen did not mention but would seem to be a part of dimension 3 knowledge is the nature of science-oriented knowledge that would enable students to appraise the statements, reports, and arguments of scientists, politicians, and journalists and to present their own supporting or opposing arguments in a coherent, robust, and convincing way (see Hodson [2009b] for a lengthy discussion of this aspect of science education). Jensen's fourth category includes awareness of how (and why) others have sought to bring about change and entails formulation of a vision of the kind of world in which we (and our families and communities) wish to live. It is important for students to explore and develop their ideas, dreams, and aspirations for themselves, their neighbors and families and for the wider communities at local, regional, national, and global levels—a clear overlap with futures studies/education. An essential step in cultivating the critical scientific and technological literacy on which **sociopolitical action depends** is the application of a social and political critique capable of challenging the notion of technological determinism. We can control technology and its environmental and social impact. More significantly, we can control the controllers and redirect technology in such a way that adverse environmental impact is substantially reduced (if not entirely eliminated) and issues of freedom, equality, and justice are kept in the forefront of discussion during the **establishment of policy**.

## realism

#### It’s true

Miller, professor of IR – University of Haifa, ‘10

(Benjamin, “Contrasting Explanations for Peace: Realism vs. Liberalism in Europe and the Middle East,” Contemporary Security Policy, Vol. 31, Iss. 1)

In what follows, I initially differentiate among types of regional security outcomes: hot/cold war and cold/warm peace. The task then is to examine what the different approaches suggest on the avenue to accomplishing peace in general and durable ‘warm’ peace in particular. Following a conceptual discussion of the realist approaches, I apply them to Europe and to the Middle East. In the next section I analyse the liberal conceptions of peace and security and then apply them to the two regions. On the whole, I show that the successful application of all four approaches brought regional peace to Europe – the realist strategies producing initially cold peace and then the liberal ones elevating it to warm peace. In contrast, only the realist strategies were effective in the Middle East, but much later than in Europe, and even then only partially, thus producing at best a fragile and partial cold peace.

In order to bring about peace to the Middle East, first of all the realist mechanisms have to be implemented more forcefully under an intensive hegemonic leadership. This leadership should be able to provide an effective security umbrella to the regional states taking part in the peace process against common revisionist threats. This leadership has then to focus on mediating key regional conflicts, but together with other international players and the regional actors, it should also focus on helping state-building and nation-building processes in the region. Only then the liberal mechanisms can be effective and warm and stabilize the regional peace as was the case in post-1945 Western Europe.

*Hot war* is a situation of actual use of force aimed to destroy the military capabilities of the adversaries. The Middle East is among the most violent-prone regions in the post-WWII international system. Thus, major examples for hot war come from this region including the Arab–Israeli wars (1948–1999, 1956, 1967, 1969–1970, 1973, 1982 and most recently the Second Lebanon War of 2006 and the Cast Lead Operation of 2008–2009), the Iran–Iraq War (1980–1988) and the Gulf War of 1990–1991.

Cold war is a situation of negative peace[1](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0001) – a mere absence of hot war in which hostilities may break out any time. It is characterized by recurrent military crises and a considerable likelihood of escalation to war, either premeditated or inadvertent.[2](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0002) The parties may succeed in managing the crises, avoiding escalation to wars while protecting their vital interests,[3](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0003) but they do not attempt seriously to resolve the fundamental issues in dispute between them. As to means employed by the parties, a cold war is characterized by the use of military forces for show-of-force purposes such as influencing the intentions of the regional rivals through deterrence and compellence.[4](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0004) Diplomacy plays an important role in the parties' relations, but it is largely a diplomacy of violence – the use of military means for diplomatic ends – for signaling, crisis management, and to clarify interests, commitments, and ‘red lines’. An important component of cold war situations is the diplomacy of regional hot war termination, manifested in the establishment of cease-fires or armistices.[5](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0005) The presence of enduring rivalries in the region is a key indicator of a cold war there.[6](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0006) Examples include the periods between the hot wars between Israel and its Arab neighbours, namely, 1949–1956, 1957–1967, 1968–1973, etc.

*Cold peace* is a situation characterized by formal agreements among the parties and the maintenance of diplomatic relations among them. The underlying issues of the regional conflict are in the process of being moderated and reduced, but are still far from being resolved. The danger of the use of force is thus unlikely in the near future, but it still looms in the background, and is possible in the longer run if changes in the international or regional environment occur. In one or more of the regional states there are still significant groups hostile to the other states, and thus the possible coming to power of belligerent opposition groups in these states may also lead to renewed hostilities or a return to cold war. The parties still feel threatened by increases in each other's power, and are concerned with relative gains.[7](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0007)

Military force is not used in the relations between the parties, not even for signalling and show-of-force purposes. Rather, the focus is on diplomatic means for the purposes of conflict reduction or mitigation,[8](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0008) and the parties seriously attempt to moderate the level of the conflict through negotiations and crisis-prevention regimes.[9](http://www.tandfonline.com/doi/full/10.1080/13523261003640967#EN0009) These efforts, however, stop short of a full-blown reconciliation among the parties. Foreign relations among the regional parties are conducted almost exclusively through intergovernmental diplomacy, and there are limitations on transnational activity which involves non-governmental players. The parties still develop contingency plans that take into account the possibility of war among them. Such plans include force structure, defence spending, training, type of weapons, fortifications, military doctrine, and war planning.

Examples include the Israeli–Egyptian peace since § Marked 12:21 § 1979 and the Israeli–Jordanian peace since 1994. Intergovernmental negotiations succeeded to reach formal peace agreements between them. These peace accords have reduced the level of conflict between Israel and these two Arab neighbours. Especially critical is the peace between Israel and Egypt as the relations between them are the key strategic relations in the Arab–Israeli context. Since they have moved to the cold peace level, the likelihood of the eruption of a major inter-state Arab–Israeli hot war has drastically declined.