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## plan

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

## prolif adv

#### Massive expansion of nuclear power’s inevitable worldwide – that causes cascading prolif

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Nuclear energy is a twentieth-century innovation but until recently has not spread beyond a relatively small number 0F industrialized nations (see maps on pages 4 5). All this is about to change. With global electricity demand increasing dramatically, greenhouse gas emissions, and energy security becoming national priorities, developed and developing countries alike are reexamining nuclear energy as a means of providing a reliable E scalable source of low-carbon power. The International Energy Agency (IEA) projects that global electricity demand will increase 2.2 percent a year to 2035, with about 80 percent of that growth occurring in emerging economies outside the Organization for Economic Cooperation £ Development (OECD).' Even if new policy initiatives are introduced to lower carbon dioxide (CO2) emissions Q combat global climate change, global energy-related CO2 emissions are expected to increase 21 percent between 2008 2035.1 Emerging market economies account For all of this projected increase in emissions. In the face of rising prices and increasing volatility in the oil market, many of these economies have shifted their attention to nuclear energy as a means of reducing dependence on oil (often a major source of their power generation), improving their balance of payments, and bolstering national energy security.’ Currently, 440 reactors with a total capacity of 375 gigawatts (G\Wc) arc in operation worlclwicle.\* As of March 2011, 65 nuclear reactor units, with a total capacity of 63 G\Ve, are under construction.5 As of April 2011, 158 projects are also on order or planned and 326 proposed." These preparations For replacing or expanding reactor ﬂeets Q For new entries to the marketplace follow a decades-long lull in construction suggest a “nuclear renaissance” has begun. \Y/hile “renaissance” implies a revival or return to a better time. the global expansion of nuclear energy in the coming decades will differ in several resects from the way civilian nuclear power developed between the late 1950s mid-19805. First, the scope and pace of this new deployment could be signiﬁcantly larger than in previous periods of expansion: some recent analyses put installed nuclear capacity up at 550—850 G\Ve by 2035. depending on assumptions about the implementation of low-carbon energy policiesf In IEA projections, a 50 per- cent cut in energy-related CO, emissions by 2050 would require global capacity to reach 1,200 G\Ve, a net addition of 30 G\Ve each year over the next forty years.“ To put this ﬁgure into perspective, during the period of nuclear p0wer’s most rapid expansion (1981-90). capacity increased by only 20 G\Ve a year, slowing to an annual average of 4 G\X/e from 1991 to 2006." To achieve large- scale reductions in energy—related CO: emissions, nuclear capacity must there- lore grow not only faster but also For several decades longer than during nuclear energy's previous “golden age." (As the preface indicates, safety concerns arising in the aftermath ofthe Fukushima accident will slow or scale back nuclear power expansion globally in the short term. At the same time, the longer-term impact of Fukushima on global nuclear power expansion will be less adverse, especially in emerging market countries.) Also different today is the number of countries seeking to build their ﬁrst nuclear power reactor. Some sixty-ﬁve countries have expressed interest in or are actively planning for nuclear power."' As the International Atomic Energy Agency (IAEA) points out, however, most of these countries are merely “con- sidering” the range of issues involved in nuclear power development. Many of them cannot realistically afford the large costs associated with civilian nuclear power programs. According to some analyses, countries with a GDP ofless than $50 billion could not spend several billion dollars building a reactor." ln addi- tion, many aspirant countries still lack the electricity grids required For nuclear power: electricity systems with a capacity below l0 G\Ve are unlikely to be able to accommodate a nuclear reactor.“ Some countries could address this issue by expanding electricity interconnections with neighboring states or developing ower export arrangements; however, these alternatives are not widely available in any case would take time to implement. At the same time, a number of countries have credible plans to become new nuclear energy states (NNES). The IAEA has indicated that ten to twenty-ﬁve countries might begin operating their ﬁrst plants by 2030, whereas since Cher- nobyl only thrce—China, Mexico, Romania—havc brought nuclear plants online for the ﬁrst time.” The following list shows the stages of progress of eleven emerging market countries in their ellorts to develop a civilian nuclear energy programz“ —Power reactors under construction: Iran.“ —Contracts signed, legal regulatory infrastructure well developed: United Arab Emirates (UAE), Turkey. —Committed plans, legal Q regulatory infrastructure developing: Vietnam, jordan. —\Well-developed plans but commitment pending: Thailand. Indonesia. Egypt, Kazakhstan. —Developing plans: Saudi Arabia, Malaysia. Emerging market nations entertaining the construction of new nuclear power capacity lace several critical issues. Domestically, each must establish strong institutions and viable regulatory frameworks addressing health, safety, prolif- eration, environmental concerns while ensuring that adequate human ﬁnancial resources are available for these tasks. Even if a state is willing to buy a nuclear reactor on a “turnkey” basis (paying For an outside operator to build Q run the system), it must still train its own nationals in these various respects Q establish a strong academic industrial culture in all aspects of commercial nuclear operations in order to achieve a sound, sustainable program. The NNES will need to build these capabilities in a sufficient timely manner. New States One of the biggest challenges in any expansion of the civilian nuclear sector is that of maintaining and strengthening the global regime for nuclear proliferation. The changing geopolitical J security environment, combined with the political instability of many regions countries that aspire to develop civilian nuclear reactor technology, has already raised proliferation concerns. Nuclear power reactors could become attractive targets for terrorists, who might also seek access to ﬁssile material for radiological dispersal devices (“dirty bombs”) or for nuclear weapons. With such materials more widely available, the proliferation risks could mount. As commercial enrichment and recycling programs multiply, countries may be tempted also to develop latent nuclear weapons capabilities, especially if they aspire to attain regional predominance, international standing, or the capabilities of regional rivals. An expansion of nuclear energy could further tax an already stressed proliferation regime. In light ofArticle IV of the Nuclear Treaty (NPT), wl1icl1 states that the treat shall not aﬁect the “inalienable right . . . to develop research, production duse of nuclear energy For peaceful purposes without discrimination . . . the right to partici ate in, the fullest possible exchange of equipment, materials H scientiﬁc ii technological information For the peaceful uses olinuclear energy, ” some nations are considering acquisition of fuel cycle capabilities as a way to avoid further dependence on foreign suppliers when they develop nuclear power.“ The NPT contains no provisions to restrict acquisition of such capabilities, although members of the Nuclear Suppliers Group (a voluntary group of nations that restricts nuclear exports) have long practiced restraint on technology transfers of sensitive components of the Fuel cycle. A sharp increase in the demand for nuclear fuel could enhance the commercial attractiveness of uranium enrichment reprocessing, enticing new entrants into the market." Nations with large uranium resources might seek to add value to their uranium exports by moving further up the chain of produc- tion or by expanding current capabilities (Australia, Canada, Kazakhstan, South Africa have all discussed this option recently). Even if the high cost of Fuel cycle activities proves to be a disincentive to their development, the NNES— especially in emerging markets—may consider Fuel supply security exercis- ing sovereign rights under Article IV of the NPT more relevant than economic drivers in their decisions about enrichment or reprocessing.“ With governments playing an increasing role in securing and meeting nuclear contracts, political motivations might also enter into assessments of the nuclear capabilities neces- sary for recipient countries. The great danger in the race to build out new capacity is that some new players may not take proliferation concerns as seriously as existing service providers. To address these issues, there has been a reinvigorated discussion of multilat- eral nuclear approaches (MN/\s). M NAs establish a framework to safeguard Arti- cle IV rights, speciﬁcally by limiting the diffusion ofsensitive nuclear materials E technologies while concurrently guaranteeing long-term supply of nuclear fuel to civilian nuclear power programs. Some steps in this direction include two recently approved fuel banks: the Russian-backed lnternational Uranium Enrich- ment Center in Angarsk the ME/\ Nuclear Threat Initiative Fuel Bank.” The institutional challenges to the regime are compounded both by the actions of rogue states such as Iran’s clandestine nuclear program and North Korea’s nuclear weapons testing Q new uranium enrichment pro- gram, Q by non-state activities such as the operations ofblack market nuclear networks arranged by Pakistani scientist A. Khan. Conﬁdence in the regime’s ability to respond to resolve proliferation threats has thus fallen. New technologies may put further stress on the system. Particularly worrying are the expansion of centrifuge technology, commercialization of the laser enrichment process, development and deployment of next-generation reprocessing techniques that require advanced safeguards, and the potential spread of fast reactors. Although the impact of these dynamics is tlifﬁcult to foresee, the proliferation regime needs to keep pace with the rapidly changing, complex nuclear market, especially those developments activities that facilitate the expansion of uranium enrichment and spent fuel reprocessing. This is a major challenge for a regime already under stress.

#### The spread of enrichment and reprocessing collapse the entire nonproliferation regime

Anatoly S. Diyakov 10, Professor of Physics and Director of the Center for Arms Control Energy and Environmental Studies at the Moscow Institute of Physics, “The nuclear “renaissance” & preventing the spread of enrichment & reprocessing technologies: a Russian view”, Dædalus Winter 2010

The anticipated growth of nuclear power around the world may lead to the spread of nuclear fuel cycle technologies as well. The expectations associated with a renewed interest in nuclear power and the rate of nuclear power growth in the world may be exaggerated; at the very least we can expect that the growth would occur not immediately, but over a long period. Nevertheless, there are definite concerns about the implications of nuclear power expansion for the nuclear nonproliferation regime. Driving these concerns is a sense that, beyond interest in nuclear power, developing countries also have an interest in retaining their right under the Nuclear Non-Proliferation Treaty (npt) to possess nuclear fuel cycle technologies. A potential spread of nuclear fuel cycle technologies, especially technologies for uranium enrichment and for reprocessing spent fuel to separate plutonium, poses a serious concern to the nuclear nonproliferation regime because enrichment and reprocessing capabilities give states the capability to produce fissile materials for weapons. This is not a new problem. Indeed, as early as 1946, the Acheson-Lillenthal report declared that proliferation risks are inherent to the nuclear fuel cycle. If nations engage in fuel cycle activities it increases the risk of: • Spread of sensitive technologies from declared facilities, resulting in their illegal transfer to other entities; • Diversion of nuclear materials from declared fuel cycle facilities; • Running a military program at undeclared fuel cycle facilities; and • Breakout–that is, withdrawal from the npt and the subsequent use of safeguarded nuclear facilities for military purposes. The reality of these dangers was recently demonstrated by North Korea and the A.Q. Khan network. International Atomic Energy Agency (iaea) Director General Mohamed ElBaradei has said that the fuel cycle is the “Achilles heel” of the nonproliferation system.8 Some countries have already declared their right to acquire enrichment and reprocessing technologies. This right is in fact secured for countries party to the npt. The npt does not restrict peaceful development and use of nuclear power; Article IV of the Treaty asserts, “Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes.” However, in ensuring the right to peaceful use of nuclear energy, the npt also imposes specific obligations upon its member states. In accordance with Article II of the npt, “Each non-nuclearweapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly. ” Article III requires that each Treaty participant state “undertakes to accept safeguards . . . for the exclusive purpose of veri½cation of the ful½llment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons.” The right to develop the nuclear fuel cycle, afforded by the npt, is considered by some to be a loophole in the nonproliferation regime. This loophole, and recent violations of commonly accepted obligations by certain countries, raises questions about the npt’s capacity to protect international security adequately from threats that may occur. It would be wrong to blame the authors of the npt for this loophole. Over the four decades that have passed since the npt ½rst came into effect, the world has changed dramatically. The npt to a large extent was initially intended to prevent creation of nuclear weapons by industrially advanced countries such as West Germany, Italy, Sweden, Switzerland, South Korea, Taiwan, and others, while simultaneously providing them the bene½t of peaceful nuclear use and security guarantees. When the npt was being negotiated in the 1960s, hardly anyone could have imagined that, with time, the main actors in proliferation and the dangers arising from it would come to be those countries that had recently become liberated from Europe’s colonial dominion (at the time called “developing” or “third-world” countries) and also non-state entities– namely, terrorist organizations. Considering that objective forces are compelling more and more countries to turn to nuclear energy to satisfy their energy needs, and that they have the right to develop the nuclear fuel cycle, it is necessary to search for solutions that, on the one hand, would prevent proliferation of sensitive nuclear technologies and, on the other hand, would ensure interested countries guaranteed access to external sources of nuclear fuel cycle services and products.

#### Squo nuclear power means quick breakout—asymmetric development of arsenals creates imbalances that undermine deterrent relationships

Sokolski 9

Henry Sokolski, Executive Director of the Nonproliferation Policy Education Center, 6/1/2009, Avoiding a Nuclear Crowd, http://www.hoover.org/publications/policy-review/article/5534

Finally, several new nuclear weapons contenders are also likely to emerge in the next two to three decades. Among these might be Japan, North Korea, South Korea, Taiwan, Iran, Algeria, Brazil (which is developing a nuclear submarine and the uranium to fuel it), Argentina, and possibly Saudi Arabia (courtesy of weapons leased to it by Pakistan or China), Egypt, Syria, and Turkey. All of these states have either voiced a desire to acquire nuclear weapons or tried to do so previously and have one or more of the following: A nuclear power program, a large research reactor, or plans to build a large power reactor by 2030.

With a large reactor program inevitably comes a large number of foreign nuclear experts (who are exceedingly difficult to track and identify) and extensive training, which is certain to include nuclear fuel making.19 Thus, it will be much more difficult to know when and if a state is acquiring nuclear weapons (covertly or overtly) and far more dangerous nuclear technology and materials will be available to terrorists than would otherwise. Bottom line: **As more states bring large reactors on line more will become nuclear-weapons-ready** — i.e., **they could come within months of acquiring nuclear weapons** if they chose to do so.20 As for nuclear safeguards keeping apace, neither the iaea’s nuclear inspection system (even under the most optimal conditions) nor technical trends in nuclear fuel making (e.g., silex laser enrichment, centrifuges, new South African aps enrichment techniques, filtering technology, and crude radiochemistry plants, which are making successful, small, affordable, covert fuel manufacturing even more likely)21 afford much cause for optimism.

This brave new nuclear world will stir existing security alliance relations more than it will settle them: In the case of states such as Japan, South Korea, and Turkey, it could prompt key allies to go ballistic or nuclear on their own.

Nuclear 1914

At a minimum, **such developments will be a departure from whatever stability existed during the Cold War**. After World War II, there was a clear subordination of nations to one or another of the two superpowers’ strong alliance systems — the U.S.-led free world and the Russian-Chinese led Communist Bloc. The net effect was relative peace with only small, nonindustrial wars. This alliance tension and system, however, no longer exist. Instead, we now have one superpower, the United States, that is capable of overthrowing small nations unilaterally with conventional arms alone, associated with a relatively weak alliance system ( nato) that includes two European nuclear powers (France and the uk). nato is increasingly integrating its nuclear targeting policies. The U.S. also has retained its security allies in Asia (Japan, Australia, and South Korea) but has seen the emergence of an increasing number of nuclear or nuclear-weapon-armed or -ready states.

So far, the U.S. has tried to cope with independent nuclear powers by making them “strategic partners” (e.g., India and Russia), nato nuclear allies (France and the uk), “non-nato allies” (e.g., Israel and Pakistan), and strategic stakeholders (China); or by fudging if a nation actually has attained full nuclear status (e.g., Iran or North Korea, which, we insist, will either not get nuclear weapons or will give them up). In this world, every nuclear power center (our European nuclear nato allies), the U.S., Russia, China, Israel, India, and Pakistan could have significant diplomatic security relations or ties with one another but none of these ties is viewed by Washington (and, one hopes, by no one else) as being as important as the ties between Washington and each of these nuclear-armed entities (see Figure 3).

There are limits, however, to what this approach can accomplish. Such a weak alliance system, with its expanding set of loose affiliations, risks becoming analogous to the international system that failed to contain offensive actions prior to World War I. Unlike 1914, there is no power today that can rival the projection of U.S. conventional forces anywhere on the globe. But in a world with an increasing number of nuclear-armed or nuclear-ready states, this may not matter as much as we think. In such a world, the **actions of just one or two states** or groups that might threaten to disrupt or overthrow a nuclear weapons state **could check U.S. influence or ignite a war Washington could have difficulty containing**. No amount of military science or tactics could assure that the U.S. could disarm or neutralize such threatening or unstable nuclear states.22 Nor could diplomats or our intelligence services be relied upon to keep up to date on what each of these governments would be likely to do in such a crisis (see graphic below):

Combine these proliferation trends with the others noted above and one could easily create the perfect nuclear storm: **Small differences between nuclear competitors** that would **put all actors on edge**; an overhang of nuclear materials **that could be called upon to break out** or significantly ramp up existing nuclear deployments; and a variety of potential new nuclear actors developing weapons options in the wings.

In such a setting, the military and nuclear **rivalries between** states could easily **be much more intense than before**. Certainly **each nuclear state’s military would place a**n even higher **premium** than before **on being able to weaponize** its military and **civilian surpluses quickly**, to deploy forces that are survivable, and to have forces that can get to their targets and destroy them with high levels of probability. The advanced military states will also be even more inclined to develop and deploy enhanced air and missile defenses and long-range, precision guidance munitions, and to develop a variety of preventative and preemptive war options.

Certainly, in such a world, relations between states could become far less stable. **Relatively small developments** — e.g., Russian support for sympathetic near-abroad provinces; Pakistani-inspired terrorist strikes in India, such as those experienced recently in Mumbai; new Indian flanking activities in Iran near Pakistan; Chinese weapons developments or moves regarding Taiwan; state-sponsored assassination attempts of key figures in the Middle East or South West Asia, etc. — **could easily prompt nuclear weapons deployments with “strategic” consequences** (**arms races, strategic miscues, and** even **nuclear war**). As Herman Kahn once noted, in such a world “every quarrel or difference of opinion may lead to violence of a kind quite different from what is possible today.”23 In short, we may soon see a future that neither the proponents of nuclear abolition, nor their critics, would ever want. None of this, however, is inevitable.

#### Prolif cascades cause militarization of disputes—escalates to great power war

Kroenig 9

Matt Kroenig, assistant professor of Government at Georgetown University and a Stanton Nuclear Security Fellow at the Council on Foreign Relations, November 2009, Beyond Optimism and Pessimism: The Differential Effects of Nuclear Proliferation, http://belfercenter.hks.harvard.edu/publication/19671/beyond\_optimism\_and\_pessimism.html

**Nuclear proliferation** can **embolden new nuclear states**, **triggering regional instability that could** potentially **threaten** the **interests of power-projecting states and** even **entrap them in regional disputes**. New nuclear weapon states may be more aggressive and this newfound assertiveness can result in regional instability. I define regional instability as a heightened frequency (but not necessarily the intensity) of militarized interstate disputes among states in a given geographical region. The threat that regional instability poses to power-projecting states is different from the concern about international instability expressed by the proliferation pessimists. Pessimists assume that international instability is bad in and of itself – and they may be right. But, power-projecting states have a different concern. They worry that nuclear proliferation will set off regional instability and that, because they have the ability to project power over the new nuclear weapon state, they will be compelled to intervene in a costly conflict. Power-projecting states could feel the need to act as a mediator between nuclear-armed disputants, provide conventional military assistance to one of the parties in the dispute, or because they have the ability to put boots on the ground in the new nuclear state, potentially be drawn into the fighting themselves.

There is direct evidence that nuclear weapons can contribute to regional instability. Robert Rauchhaus has demonstrated that **nuclear weapon states are more likely to engage in conflict than nonnuclear weapon states**. 46 Michael Horowitz extends this analysis to show that **aggressiveness is most pronounced in new nuclear states** **that have less experience with nuclear diplomacy**.47 These related findings are not due to the fact that dispute-prone states are more likely to acquire nuclear weapons; the scholars carefully control for a state’s selection into nuclear status. Rather, the findings demonstrate that nuclear weapons increase the frequency with which their possessors participate in militarized disputes. Qualitative studies have also provided supporting evidence of nuclear weapons’ potentially destabilizing effects. Research on internal decision-making in Pakistan reveals that Pakistani foreign policymakers may have been emboldened by the acquisition of nuclear weapons, **encouraging them to initiate militarized disputes** against India.48

Proliferation optimists counter that nuclear proliferation should increase regional stability, but the most recent empirical investigations undermine the stronger versions of the optimism argument.49 While nuclear-armed states may be less likely to experience full-scale war providing some support for the optimist position, **the preponderance of evidence suggests that nuclear-armed states are more likely to engage in** other types of **militarized disputes**.50 This is true whether only one state or all of the contentious actors in a region possess nuclear weapons.51

Furthermore, for the sake of argument, even if nuclear proliferation does have stabilizing effects as optimists argue, as long as regional conflict among nuclear-armed states is possible, the basic argument presented here still holds. This is because power-projecting states may still feel compelled to intervene in the conflicts that do occur. These are conflicts that they perhaps **could have avoided had nuclear weapons been absent**.

There is direct evidence that regional conflicts involving nuclear powers can encourage power-projecting states to become involved in nuclear disputes. Secretary of State Henry Kissinger was reluctant to aid Israel in the 1973 Yom Kippur War until Israeli Prime Minister Golda Meir threatened that, without U.S. assistance, she might be forced to use nuclear weapons against the Arab armies.52 In response, Kissinger reversed his decision and provided emergency aid to the Israeli DefenseForces.53 The Soviet Union also considered a military intervention to help its Arab proxies in the Yom Kippur War, causing the United States to go on nuclear alert, and leading leaders in both Moscow and Washington to consider the very real possibility that a conflict involving a regional nuclear power could spiral into a superpower war.54 Similarly, in 1999 and 2002, the United States became caught in diplomatic initiatives to prevent nuclear war in crises between the nuclear- armed countries of India and Pakistan.55

Indeed, the expectation that powerful states will intervene in conflicts involving a nuclear-armed state is so firmly ingrained in the strategic thinking of national leaders that small nuclear powers actually incorporate it into their strategic doctrines. South Africa’s nuclear doctrine envisioned, in the event of an imminent security threat, the detonation of a nuclear weapon, not against the threatening party, but over the Atlantic Ocean in an attempt to jolt the United States into intervening on South Africa’s behalf.56 Israel’s nuclear doctrine was also constructed along similar lines. While the Israelis are notoriously silent about the existence and purpose of their nuclear arsenal, Francis Perrin, a French official who assisted in the development of Israel’s nuclear program in the 1950s and 1960s, explained that Israel’s arsenal was originally aimed “against the Americans, not to launch against America, but to say ‘If you don’t want to help us in a critical situation, we will require you to help us. Otherwise, we will use our nuclear bombs.’”57 Similarly, Pakistan’s surprise raid on Indian-controlled Kargil in 1999 was motivated partly by the expectation that Pakistan would be able to retain any territory it was able to seize quickly, because Pakistani officials calculated that the United States would never allow an extended conflict in nuclear South Asia.58

For these reasons, power-projecting states worry about the effect of nuclear proliferation on regional stability. U.S. officials feared that nuclear proliferation in Israel could embolden Israel against its Arab enemies, or entice Arab states to launch a preventive military strike on Israel’s nuclear arsenal. In a 1963 NIE on Israel’s nascent nuclear program, the consensus view of the U.S. intelligence community was that if Israel acquired nuclear weapons, “Israel’s policy toward its neighbors would become more rather than less tough...it would seek to exploit the psychological advantage of its nuclear capability to intimidate the Arabs.”59 President Kennedy concurred. In a letter to Israeli Prime Minister David Ben-Gurion, Kennedy wrote that Israel should abandon its nuclear program because Israel’s “development of such (nuclear) weapons would dangerously threaten the stability of thearea.”60 Similarly, in the case of China’s nuclear program, U.S. officials believed that a nuclear-armed China would “be more willing to take risks in military probing operations because of an overoptimistic assessment of its psychological advantage.”61

More recently, U.S. officials have continued to fear the effect of nuclear proliferation on regional stability. In a 1986 Top Secret CIA Assessment, U.S. intelligence analysts predicted that a nuclear North Korea would have “a free hand to conduct paramilitary operations without provoking a response.”62 Similarly, a U.S. expert testified before Congress in 2006 that “A nuclear arsenal in the hands of Iran’s current theocratic regime will be a source of both regional and global instability.”63

U.S. officials assessed that regional instability set off by nuclear proliferation could compel them to intervene directly in regional conflicts. In the early 1960s, U.S. officials speculated that Israel could potentially leverage its nuclear arsenal to compel the United States to intervene on its behalf in Middle Eastern crises.64 Similarly, in 1965, Henry Rowen, an official in the Department of Defense, assessed that if India acquired nuclear weapons, it could lead to a conflict in South Asia “with a fair chance of spreading and involving the UnitedStates.”65 At the time of writing, U.S. defense strategists are planning for the possibility that the United States may be compelled to intervene in regional conflicts involving a nuclear-armed Iran or North Korea and their neighbors.66

Leaders in power-projecting states also fear that **regional instability set off by nuclear** proliferation could entrap power-projecting states in a **great power war**. Other power- projecting states, facing a mirror-image situation, may feel compelled to intervene in a crisis to secure their own interests, **entangling multiple great powers in a regional conflict**. In a 1963 NIE, U.S. intelligence analysts assessed that “the impact of (nuclear proliferation in the Middle East) will be the possibility that hostilities arising out of existing or future controversies could escalate into a confrontation involving the major powers.”67 President Johnson believed that a nuclear Israel meant increased Soviet involvement in the Middle East and perhaps superpower war.68 If historical experience provides a guide, U.S. strategists at the time of writing are undoubtedly concerned by the possibility that China may feel compelled to intervene in any conflict involving a nuclear-armed North Korea, making the Korean Peninsula another dangerous flash-point in the uncertain Sino-American strategic relationship.

#### Cold War no longer applies—nuclear war

Cimbala 8

Stephen Cimbala, Ph.D., Penn State Brandywine Political Science Distinguished Professor, 2008, Anticipatory Attacks: Nuclear Crisis Stability in Future Asia, Comparative Strategy Volume 27, Issue 2

The spread of nuclear weapons in Asia presents a complicated mosaic of possibilities in this regard. **States with nuclear forces of variable force structure, operational experience, and command-control systems** will be thrown into a **matrix of complex political, social, and cultural** **crosscurrents contributory to the possibility of war**. In addition to the existing nuclear powers in Asia, others may seek nuclear weapons if they feel threatened by regional rivals or hostile alliances. Containment of nuclear proliferation in Asia is a desirable political objective for all of the obvious reasons. Nevertheless, the present century is unlikely to see the nuclear hesitancy or **risk aversion that marked the Cold War**, in part, because the military and political discipline imposed by the Cold War superpowers no longer exists, but also because states in Asia have new aspirations for regional or global respect. 12

The spread of ballistic missiles and other nuclear-capable delivery systems in Asia, or in the Middle East with reach into Asia, is especially dangerous because **plausible adversaries live close together and are already engaged in ongoing disputes about territory** or other issues. 13 The Cold War Americans and Soviets required missiles and airborne delivery systems of intercontinental range to strike at one another's vitals. But short-range ballistic missiles or fighter-bombers suffice for India and Pakistan to launch attacks at one another with potentially “strategic” effects. China shares borders with Russia, North Korea, India, and Pakistan; Russia, with China and North Korea; India, with Pakistan and China; Pakistan, with India and China; and so on.

**The** short flight times **of ballistic missiles between** the cities or military forces of **contiguous states means that very little time will be available for warning and attack assessment** by the defender. Conventionally armed missiles could easily be mistaken for a tactical nuclear first use. Fighter-bombers appearing over the horizon could just as easily be carrying nuclear weapons as conventional ordnance. In addition to the challenges posed by shorter flight times and uncertain weapons loads, potential victims of nuclear attack in Asia may also have first strike–**vulnerable forces and command-control systems** that **increase decision pressures for rapid, and** possibly **mistaken, retaliation**.

This potpourri of possibilities challenges conventional wisdom about nuclear deterrence and proliferation on the part of policymakers and academic theorists. For policymakers in the United States and NATO, spreading nuclear and other weapons of mass destruction in Asia could profoundly shift the geopolitics of mass destruction from a European center of gravity (in the twentieth century) to an Asian and/or Middle Eastern center of gravity (in the present century). 14 This would profoundly shake up prognostications to the effect that wars of mass destruction are now passe, on account of the emergence of the “Revolution in Military Affairs” and its encouragement of information-based warfare. 15 Together with this, there has emerged the argument that large-scale war between states or coalitions of states, as opposed to varieties of unconventional warfare and failed states, are exceptional and potentially obsolete. 16 **The spread of WMD** and ballistic missiles in Asia could **overturn** these **expectations for the obsolescence** or marginalization **of major interstate warfare**.

For theorists, the argument that the spread of nuclear weapons might be fully compatible with international stability, and perhaps even supportive of international security, may be less sustainable than hitherto. 17 Theorists optimistic about the ability of the international order to accommodate the proliferation of nuclear weapons and delivery systems in the present century have made several plausible arguments based on international systems and deterrence theory. First, nuclear weapons may make states more risk averse as opposed to risk acceptant, with regard to brandishing military power in support of foreign policy objectives. Second, if states' nuclear forces are second-strike survivable, they contribute to reduced fears of surprise attack. Third, the motives of states with respect to the existing international order are crucial. Revisionists will seek to use nuclear weapons to overturn the existing balance of power; status quo–oriented states will use nuclear forces to support the existing distribution of power, and therefore, slow and peaceful change, as opposed to sudden and radical power transitions.

These arguments, for a less alarmist view of nuclear proliferation, take comfort from the history of nuclear policy in the “first nuclear age,” roughly corresponding to the Cold War. 18 Pessimists who predicted that some thirty or more states might have nuclear weapons by the end of the century were proved wrong. However, **the Cold War is a dubious precedent for the control of nuclear weapons** spread outside of Europe. The military and security agenda of the Cold War was dominated by the United States and the Soviet Union, especially with regard to nuclear weapons. Ideas about mutual deterrence based on second-strike capability and the deterrence “rationality” according to American or allied Western concepts might be inaccurate guides to the avoidance of war outside of Europe.

#### A strong SMR industry’s key to US leadership, market share, and cradle to grave

Mandel 9

(Jenny – Scientific American, Environment & Energy Publishing, LLC, “Less Is More for Designers of "Right-Sized" Nuclear Reactors” September 9, 2009, http://www.scientificamerican.com/article.cfm?id=small-nuclear-power-plant-station-mini-reactor)

Tom Sanders, president of the American Nuclear Society and manager of Sandia National Laboratories' Global Nuclear Futures Initiative, has been stumping for small rectors for more than a decade. American-made small reactors, Sanders insists, can play a central role in global nonproliferation efforts. "Our role at Sandia is the national security-driven notion that it's in the interests of the U.S. to be one of the dominant nuclear suppliers," Sanders said. While U.S. companies have been exiting the industry over the past decades as government and popular support for new construction has waned, Sanders maintains that **strong U.S. participation in the nuclear energy marketplace** would give diplomats a new tool to use with would-be nuclear powers. "It's hard to tell Iran what to do if you don't have anything Iran wants," he explained. Sanders said mini-reactors are ideal to sell to developing countries that want to boost their manufacturing might and that would otherwise look to other countries for nuclear technologies**. If the U**nited **S**tates **is not participating in that market**, he said, **it becomes hard to steer buyers away from technologies that pose greater proliferation risks.** Sanders been promoting this view since the 1990s, he said, when he realized "we were no longer selling nuclear goods and services, so we could no longer write the rules." The domestic nuclear industry had basically shut down, with no new construction in decades **and a flight of talent and ideas overseas**. There is a silver lining in that brain drain, though, he believes, in that U.S. companies getting back into the game now are less tied to the traditional, giant plants and are freer to innovate. A feature that several of the new product designs share is that the power plants could be mass-produced in a factory to minimize cost, using robots to ensure consistency. Also, with less design work for each installation, the time to complete an order would be shortened and some of the capital and other costs associated with long lead times avoided, Sanders said. Another feature he favors is building the plants with a lifetime supply of fuel sealed inside. Shipped loaded with fuel, such reactors could power a small city for 20 years without the host country ever handling it. Once depleted, the entire plant would be packed back up and shipped back to the United States, he said, with the sensitive spent fuel still sealed away inside. Sanders is working on a reactor design hatched by the lab with an undisclosed private partner. He believes it is feasible to build a prototype modular reactor -- including demonstration factory components and a mockup of the reactor itself -- as early as 2014, for less than a billion dollars. A mini-reactor could ring up at less than $200 million, he said, or at $300 million to $400 million with 20 years of fuel. At $3,000 to $4,000 per kilowatt, he said, that would amount to significant savings over estimates of $4,000 to $6,000 per kilowatt for construction alone with traditional plant designs. To get a design ready to build, Sanders is urging a partnership between the government and the private sector. "If it's totally a government research program, labs can take 20 to 30 years" to finish such projects, he said. "If it becomes a research science project, it could go on forever." New approach, old debates So far, **there is no sign that the** government's nuclear gatekeeper, **NRC, is wowed by the small-reactor designs.** NRC's Office of New Reactors warned Babcock & Wilcox in June that the agency "will need to limit interactions with the designers of small power reactors to occasional meetings or other nonresource-intensive activities" over the next two years because of a crowded schedule of work on other proposals. Meanwhile, opponents of nuclear technologies are not convinced that small reactors are an improvement over traditional designs. Arjun Makhijani, who heads the Institute for Energy and Environmental Research, a think tank that advocates against nuclear power, sees disseminating the technology as incompatible with controlling it. "A lot of the proliferation issue is not linked to having or not having plutonium or highly enriched uranium, but who has the expertise to have or make bombs," Makhijani said. "In order to spread nuclear technologies, you have to have the people who have the expertise in nuclear engineering, who know about nuclear materials and chain reactions and things like that -- the same expertise for nuclear bombs. That doesn't suffice for you to make a bomb, but then if you clandestinely acquire the materials, then you can make a bomb." Peter Wilk, acting program director for safe energy with Physicians for Social Responsibility, an anti-nuclear group, argues that expanding nuclear power use runs counter to the goal of nonproliferation. "The whole proposition presupposes an ... international economy in which more and more fuel is produced and more and more waste must be dealt with, which only makes those problems that are still unsolved larger," he said. "It may or may not do a better job of preventing the host country from literally getting their hands on it, but it doesn't reduce the amount of fuel in the world or the amount of waste in the world," Wilk added. And then there is the issue of public opinion. "Imagine that Americans would agree to take the waste that is generated in other countries and deal with it here," Makhijani said. "At the present moment, it should be confined to the level of the fantastic, or even the surreal. If [the technology's backers] could come up with a plan for the waste, then we could talk about export." Makhijani pointed to a widely touted French process for recycling nuclear waste as a red herring (ClimateWire, May 18). "It's a mythology that it ameliorates the waste problem," he said. According to Makhijani's calculations, the French recycling process generates far more radioactive waste than it cleans up. One category of highly radioactive material, which ends up stored in glass "logs" for burial, is reduced, he said. But in processing the waste, about six times the original volume of waste is produced, he said. Much of that must be buried deep underground, and the discharge of contaminated wastewater used in recycling has angered neighboring countries, he said. Operational risk, of course, is another major concern. "One has reduced the amount of unnecessary risk," Wilke said, "but it's still unnecessary risk." He added, "I get the theory that smaller, newer, ought to be safer. The question is: Why pursue this when there are so many better alternatives?" To Sandia's Sanders, Wilke is asking the wrong question. With the governments of major economies like China, Russia and Japan putting support and cash into nuclear technologies, the power plants are here to stay, he believes. "There's going to be a thousand reactors built over the next 50 years," he said. "The question is: Are we building them, or are we just importing them?"

#### Only commercial and diplomatic leadership solves ENR

**BPC 12**, Bipartisan Policy Center, “Maintaining U.S. Leadership in Global Nuclear Energy Markets”, July, <http://bipartisanpolicy.org/sites/default/files/Leadership%20in%20Nuclear%20Energy%20Markets.pdf>

Strategic Goal: Continued strong U.S. leadership in global nuclear security matters is central to protecting our national security interests. In particular, U.S. leadership in nuclear technology and operations can strengthen U.S. influence with respect to other countries’ nuclear programs and the evolution of the international nonproliferation regime, while also supporting U.S. competitiveness in a major export market. Nuclear power technologies are distinct from other potential exports in energy or in other sectors where America’s competitive advantage may also be declining. Because of the potential link between commercial technology and weapons development, nuclear power is directly linked to national security concerns, including the threat of proliferation. Although reactors themselves do not pose significant proliferation risks, both uranium-enrichment and spent fuel–processing technologies can be misused for military purposes. If U.S. nuclear energy leadership continues to diminish, our nation will be facing a situation in which decisions about the technological capabilities and location of fuel-cycle facilities throughout the world will be made without significant U.S. participation. Leadership is important in both commercial and diplomatic arenas, and it requires a vibrant domestic industry; an effective, independent regulator; access to competitive and innovative technologies and services; and the ability to offer practical solutions to safety, security, and nonproliferation challenges (an international fuel bank, for example, could help address concerns about the proliferation of uranium-enrichment capabilities). COMMERCIAL NUCLEAR OPERATIONS As the world’s largest commercial nuclear operator and dominant weapons state, the United States has traditionally been the clear leader on international nuclear issues. Today, the United States still accounts for approximately one-quarter of commercial nuclear reactors in operation around the world and one-third of global nuclear generation.33 This position is likely to shift in coming decades, as new nuclear investments go forward in other parts of the world while slowing or halting in the United States. In past decades, the United States was also a significant exporter of nuclear materials and technologies, but this dominance too has slowly declined. At present, however, the U.S. safety and security infrastructure and regulatory framework remain without peer and U.S. expertise and guidance on operational and regulatory issues continues to be sought around the world. The domestic nuclear industry established the INPO in the wake of the Three Mile Island accident in 1979 in a collective effort to hold all industry players accountable to the highest standards for safe and reliable commercial operations. Similarly, the NRC is seen as the gold standard for commercial nuclear regulation. As long as other countries seek to learn from the experience and expertise of U.S. firms and regulators, the United States will enjoy greater access to international nuclear programs. A substantial reduction in domestic nuclear energy activities could erode U.S. international standing. COMPETITIVE COMMERCIAL NUCLEAR EXPORTS As an active participant in commercial markets, the United States has considerable leverage internationally through the 123 Agreements (in reference to Section 123 of the Atomic Energy Act) and Consent Rights on nuclear technologies exported by the U.S. nuclear industry. These mechanisms provide a direct and effective source of leverage over other countries’ fuel-cycle decisions. U.S. diplomatic influence is also important, but absent an active role in commercial markets, it may not be sufficient to project U.S. influence and interests with respect to nuclear nonproliferation around the world. At an October 2011 Nuclear Initiative workshop on “Effective Approaches for U.S. Participation in a More Secure Global Nuclear Market,” Deputy Secretary of Energy Daniel B. Poneman framed commerce and security not as competing objectives but as “inextricably intertwined.”34 He also highlighted several ways in which a robust domestic nuclear energy industry can further our country’s nonproliferation goals. Deputy Secretary Poneman emphasized the importance of U.S. leadership not only in the commercial marketplace but in international nonproliferation organizations like the International Atomic Energy Agency (IAEA) as well. In addition, BPC’s Nuclear Initiative recognizes that a nuclear accident is a low-probability event that would have high consequences regionally or globally. Many countries that have expressed interest in, or the intention to, develop domestic nuclear power lack important infrastructure, education, and regulatory institutions. We believe that, if these programs move forward, the United States has a critical commercial and advisory role to play.

#### Cradle to grave solves cascades

McGoldrick 11

Fred McGoldrick, CSIS, spent 30 years at the U.S. State and Energy Departments and at the U.S. mission to the IAEA, negotiated peaceful nuclear cooperation agreements with a number of countries and helped shape the policy of the United States to prevent the spread of nuclear weapons, May 2011, Limiting Transfers of Enrichment and Reprocessing Technology: Issues, Constraints, Options, http://belfercenter.ksg.harvard.edu/files/MTA-NSG-report-color.pdf

The U.S. has been exploring the possibilities of developing offers by one or more suppliers to lease or sell power reactor fuel to consumer states, with the understanding that the resultant spent fuel would be returned to one of the supplier countries or to suitable alternative locations, such as a regional or international used fuel storage facility or waste repository, (if a host state can be found), where it would be treated, recycled or where wastes could be ultimately disposed of. 4.3.1 Offering a Broad-based Cradle-to-Grave Fuel Cycle Service. This option would involve a major diplomatic initiative to explore the possibility that one or more supplier states could offer cradle-to-grave services to all states without E&R plants as an incentive for states to forgo the development of such capabilities. Advantages If one or more suppliers could offer a “cradle-to-grave” fuel supply program, it could prove to be far more effective than some other techniques in discouraging the spread of reprocessing facilities. Because the commercial market already provides strong assurance of fresh fuel supply, while management of spent fuel is unresolved, such a service offer could create stronger incentives for countries to rely on international fuel supply than steps such as fuel banks would. Russia has already implemented such a program on a limited scale. Moscow has concluded an agreement to provide fresh nuclear fuel for the Bushehr nuclear power plant in Iran and to take back the used nuclear fuel to Russia. The Russians have also taken back some spent pow- er reactor fuel from East European countries and have indicated that they might be willing to consider taking back spent fuel of Russian-origin in the future—they have recently offered such deals to Vietnam and Turkey—but do not seem ready to accept spent fuel produced from fuel from non-Russian suppliers. If Russia were to offer a broad-based a cradle-to-grave program, **it may put pressure on its competitors in the reactor and enrichment markets to** try to **follow suit**. If a country agreed to accept spent fuel from other countries on a commercial basis, the supplier of the fresh fuel and the country to which the spent fuel was sent would not have to be the same for a cradle-to-grave service to work.

## dod adv

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

Robitaille 12

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

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

#### Those communication breakdowns go nuclear

Andres and Breetz 11

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

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

#### Grid 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.

#### 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.

#### SMR’s solve blackouts at the Guam base

Baker 12

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

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

#### Solves a Chinese attack on Taiwan

Caryl, 7

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So why all the fuss over a tropical island just 30 miles long, known mainly for its white-sand beaches and glorious sunsets? The answer: the Pentagon has begun a major redeployment of U.S. forces in the region, pulling troops and equipment out of sometimes unreliable allies and beefing up its presence in more-congenial locales. First on its list is Guam, a U.S. territory since 1898 that **is fast becoming the linchpin of Washington's new Asia strategy.** Current U.S. forces on the island number just a few thousand but within a decade will total well over 20,000—about the same size as the Bush administration's planned surge in Iraq. By comparison, there are some 29,000 U.S. troops left in South Korea, yet despite the dangers of a nuclear-armed North, that number is expected to drop significantly.

At a time when most of the world's attention is focused on the United States' misadventures in Iraq and Afghanistan, Pentagon planners are quietly working on ways to fortify the U.S. presence in East Asia. And they're looking to do so in ways that will give them a free hand in a wide range of contingencies—including fighting regional terrorists and a possible showdown with China. Guam offers the U.S. military both proximity to potential hot spots and the advantages of operating off U.S. soil. The transfer of forces to the island also reflects the Pentagon's determination to give regional allies such as South Korea and Japan more responsibility for their own security. Guam, a sleepy but diverse place that looks like a cross between Micronesia and Middle America, has long served as a U.S. air base and way station for troops traveling through the Pacific. At the end of the cold war, the Pentagon began shutting down some facilities on the island. But then came September 11, and a dramatic reassessment of America's global forces. Former secretary of Defense Donald Rumsfeld began to advocate the lily-pad strategy: rather than relying on large, static bases in Germany and South Korea, the Pentagon should create a global network of jumping-off points for quick responses to unpredictable attacks. Guam is an ideal lily pad, since the United States can act there without seeking permission from allies, says Honolulu-based defense analyst Richard Halloran. Declares Carl Peterson of the Guam Chamber of Commerce: "This is the U.S. in Asia. This is the tip of the spear." The island has already become a convenient base for fighting Washington's "Global War on Terror" in Indonesia and the Philippines. Small wonder that Brig. Gen. Douglas H. Owens, the commanding officer of Guam's Andersen Air Force Base, describes the island as "an unsinkable aircraft carrier." It's also well positioned for possible trouble to come. As Rear Adm. Charles Leidig, U.S. Navy commander on Guam, points out, if you take a map and draw a circle with Guam at the center and a radius of 1,500 nautical miles—equivalent to three hours' flying time or two to three days by ship—you come close to the main islands of Japan, Okinawa, Indonesia and the Philippines. China and the Korean Peninsula are only a bit farther off. So are several of the world's most important sea lanes, such as the Strait of Malacca, through which some 50 percent of the world's oil passes each year. The Pentagon, however, may be building up its forces on Guam with even bigger game in mind. "The larger strategic rationale [for the shift] can be summed up in one word, and that's 'China'," says Halloran. "They [the Bush administration] don't want to contain China, and they couldn't. What they are trying to do is to deter the Chinese. That's what the buildup on Guam is all about." The nature of the U.S. reorganization reinforces this point. Washington and Tokyo have agreed to move 8,000 Marines to Guam from Okinawa by 2014, at a cost of $10 billion (60 percent of which will be paid for by the Japanese government). But this is only the most public part of a broader buildup that has largely escaped notice. If all the pieces come together, it could mean billions more in Defense Department funds and a total increase in Guam's population (which is currently just 170,000) of 35,000. Guam is already home to a major U.S. Navy port and one of the biggest bases in the U.S. Air Force, featuring twin two-mile-long runways. Not long after September 11, flights of massive B-52 bombers began returning to Andersen to carry out regular training missions. Now the Air Force has begun to prepare for the deployment of tanker aircraft and up to 48 fighter planes, including the state-of-the-art F-22 Raptor. Andersen has also already started construction of a $52.8 million project that will house up to 10 Global Hawks--large unmanned spy planes that, according to Pacific Command Air Force Gen. Paul Hester, could end up replacing aging U-2 spy planes now based in South Korea. Meanwhile, the Navy has turned its port at Guam's Apra Harbor into a home for two Los Angeles-class nuclear-powered attack submarines, with a third to come later this year. It also plans to refurbish wharves to accommodate aircraft carriers and to transform Guam into a base for its new Littoral Combat Ship (a shallow-draft stealth ship designed to operate close to shore) and Trident submarines. The Tridents, immense cold-war-era craft converted to fire Tomahawk cruise missiles, can also be used by Navy Special Operations Forces, who can set off on missions in mini-submarines launched through the Tridents' missile ports. Guam is already home to an undisclosed number of Navy SEALs, many of whom have seen duty in the war on terror, and their number will likely grow. Guam's new capabilities, however, are designed for more than just low-intensity conflicts. The attack submarines that will soon be based there, for example, probably wouldn't be much use in a conflict with North Korea or Qaeda-allied terrorists in the Philippines; the presence of the subs, experts say, is clearly aimed at the possibility of a naval confrontation with China over the Taiwan Strait. Similarly, analysts argue, the stationing of F-22s and tanker planes on Guam points to the Pentagon's desire to ensure dominance in the air should it have to fight the Chinese. China's media often worry about just this scenario, but not everyone agrees that China is the main target of the Guam buildup. Evan Medeiros of the RAND Corporation says "the initial impetus and primary driver" were to restructure the U.S. military for the wide range of operations it now faces, from fighting the war on terror to chasing pirates and conducting humanitarian missions. In the complicated post-9/11 world, the United States believes it must be able to respond to various threats as flexibly as possible. This means keeping its forces close to the action. In the past that's required basing them in other countries' territories. But Guam offers an almost unique combination of a good location, excellent facilities (including a topnotch harbor, vast warehouses and massive airfields) and a lack of political restraints. As Kurt Campbell, a former White House staffer and Defense Department official now at the Center for a New American Security, says, "[Guam is] a point from which you can do a variety of things. And it's a place to remind people that you're still focused on the region." Campbell points out that these secondary missions, such as protecting sea lanes, countering weapons proliferation and conducting relief missions, remain important; the U.S. military's humanitarian efforts after the tsunami of December 2005 gave a huge boost to the country's reputation in Asia. Brad Glosserman, executive director of Pacific Forum CSIS, a Hawaii-based think tank, agrees. The Asia-Pacific region, he says, "is a jigsaw puzzle where all the pieces are changing shape and size all the time. China's the big story--but there are also changes going in on Japan, India, South Korea, Taiwan." One such development driving the move to Guam has been the steady withdrawal of the United States from South Korea in recent years (more than 9,000 troops have left in the last three years)--a result, in part, of rising anti-Americanism there and Rumsfeld's reluctance to keep troops in politically sensitive places. Some Air Force units that have pulled out of South Korea have already arrived on Guam; others may be yet to come. That, along with the planned removal of the Marines from Okinawa, has led some commentators to characterize the Guam expansion as evidence of a virtual U.S. retreat from East Asia. But Campbell and others disagree: "I would see this not as a retrenchment but as a diversification." Indeed, after years of maintaining an even balance between its Atlantic and Pacific fleets, the U.S. Navy is now clearly emphasizing its force in Asia.

#### Nuclear war

Glaser, Professor of Political Science and International Affairs – George Washington University, ‘11

(Charles, “Will China’s Rise Lead to War?” *Foreign Affairs* Vol. 9 Iss. 2, March/April)

THE PROSPECTS for avoiding intense military competition and war may be good, but growth in China's power may nevertheless require some changes in U.S. foreign policy that Washington will find disagreeable--particularly regarding Taiwan. Although it lost control of Taiwan during the Chinese Civil War more than six decades ago, China still considers Taiwan to be part of its homeland, and unification remains a key political goal for Beijing. China has made clear that it will use force if Taiwan declares independence, and much of China's conventional military buildup has been dedicated to increasing its ability to coerce Taiwan and reducing the United States' ability to intervene. Because China places such high value on Taiwan and because the United States and China--whatever they might formally agree to--have such different attitudes regarding the legitimacy of the status quo, the issue poses special dangers and challenges for the U.S.-Chinese relationship, placing it in a different category than Japan or South Korea.

A crisis over Taiwan could fairly easily escalate to nuclear war, because each step along the way might well seem rational to the actors involved. Current U.S. policy is designed to reduce the probability that Taiwan will declare independence and to make clear that the United States will not come to Taiwan's aid if it does. Nevertheless, the United States would find itself under pressure to protect Taiwan against any sort of attack, no matter how it originated. Given the different interests and perceptions of the various parties and the limited control Washington has over Taipei's behavior, a crisis could unfold in which the United States found itself following events rather than leading them.

Such dangers have been around for decades, but ongoing improvements in China's military capabilities may make Beijing more willing to escalate a Taiwan crisis. In addition to its improved conventional capabilities, China is modernizing its nuclear forces to increase their ability to survive and retaliate following a large-scale U.S. attack. Standard deterrence theory holds that Washington's current ability to destroy most or all of China's nuclear force enhances its bargaining position. China's nuclear modernization might remove that check on Chinese action, leading Beijing to behave more boldly in future crises than it has in past ones. A U.S. attempt to preserve its ability to defend Taiwan, meanwhile, could fuel a conventional and nuclear arms race. Enhancements to U.S. offensive targeting capabilities and strategic ballistic missile defenses might be interpreted by China as a signal of malign U.S. motives, leading to further Chinese military efforts and a general poisoning of U.S.-Chinese relations.

## solvency

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

Andres and Breetz 11

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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**.

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

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

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

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

ANA 12

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

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

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

#### 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].

## 2ac

## prolif

#### No causal link – his study’s flawed

Scott D. Sagan 10, poli sci at Stanford, “Nuclear Power, Nuclear Proliferation and the NPT”, August 9, paper presented at the 2010 American Political Science Association Meeting

There are three problems, however, with Fuhrmann’s analysis. First, the apparently high effects are based on a small number of cases. In his statistical analysis 3 states pursued nuclear weapons without NCAs (.07 percent of observations), and 12 states pursued after receiving NCAs (.42 percent of observations). While technically this means that states became 500 percent more likely to pursue nuclear weapons, the likelihood is still less than half a percent. Moreover, the lag time Fuhrmann includes in his variable for pursuit drops Russia and the US from this analysis entirely, further overemphasizing this effect. Thus his claims, while technically correct, certainly overstate the substantive effects of NCAs. Second, Fuhrmann did not adequately control for whether the countries in question were already exploring the nuclear weapons option when they signed nuclear cooperation agreements. While he contends that NCAs increase the likelihood of pursuit and acquisition of nuclear weapons, it seems reasonable that a country’s interest in nuclear technology would make participation in an NCA more likely. Thus it could be that NCAs are not driving programs, but rather that plans for nuclear weapons programs are motivating NCAs. Sonali Singh and Christopher Way’s original data set, which Furhmann uses, includes a measure of whether a state is exploring nuclear weapons production, a phase preceding the development of a program. Of Fuhrmann’s five case studies, three countries – Israel, Pakistan, and India – received substantial nuclear assistance after they were already coded by Singh and Way as exploring, but not pursuing nuclear weapons. North Korea received aid from the Soviet Union at about the same time it began exploring. Only South Africa, received all of its aid before exploring in 1969, and it is notable that this assistance was provided in the 1950s, before the establishment of the NPT regime.34 Third, the use of aggregate NCAs as an independent variable both places a great deal of weight on countries, like India, that participated in a large number of NCAs prior to acquisition of nuclear weapons and may include cases in which NCAs were offered to a state that was known to be exploring a nuclear weapons option in an attempt to provide economic carrots to keep it from pursuing nuclear weapons to completion. In short, Furhmann does demonstrate that there is a correlation between the number of NCAs a state receives and the likelihood that it will later start a nuclear weapons program and acquire nuclear weapons. But he does not demonstrate that there is a causal link between civilian power agreements and nuclear weapons proliferation.

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

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

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

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

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

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

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

## elections – russia

No war

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

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

#### Collapse inevitable no matter who wins

Bovt, 9/12

(Columnist-Moscow Times, “Whether Obama or Romney, the Reset Is Dead,” http://www.themoscowtimes.com/opinion/article/whether-obama-or-romney-the-reset-is-dead/467947.html#ixzz274U7VOyl

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

## elections

No comebacks in the last fifteen presidential elections

Klein, 9-17

Ezra Klein, author of the Washington Post’s Wonk Blog, “The Romney campaign is in trouble,” http://www.washingtonpost.com/blogs/ezra-klein/wp/2012/09/17/romney-is-behind-and-the-debates-arent-likely-to-save-him/

On the presidential level, where everyone running campaigns is very, very good at their jobs, campaign infighting and incoherence tend to be the result of a candidate being behind in the polls, not the cause of it. Romney is behind and has been there for quite some time. According to the Real Clear Politics average of head-to-head polls, Romney hasn’t led the race since October 2011. The closest he came to a lead in the polls this year was during the Republican National Convention, when he managed to … tie Obama.

Romney is also behind in most election-forecasting models. Political scientist James Campbell rounded up 13 of the most credible efforts to predict the election outcome: Romney trails in eight of them. He’s also behind in Nate Silver’s election model, the Princeton Election Consortium’s meta-analysis, Drew Linzer’s Votamatic model and the Wonkblog election model.

But I didn’t realize quite how dire Romney’s situation was until I began reading “The Timeline of Presidential Elections: How Campaigns Do and Don’t Matter,” a new book from political scientists Robert Erikson and Christopher Wlezien.

What Erikson and Wlezien did is rather remarkable: They collected pretty much every publicly available poll conducted during the last 200 days of the past 15 presidential elections and then ran test after test on the data to see what we could say about the trajectory of presidential elections. Their results make Romney’s situation look very dire.

For instance: The least-stable period of the campaign isn’t early in the year or in the fall. It’s the summer. That’s because the conventions have a real and lasting effect on a campaign.

“The party that gains pre- to post-convention on average improves by 5.2 percentage points as measured from our pre- and post-convention benchmarks,” write Erikson and Wlezien. “On average, the party that gains from before to after the conventions maintains its gain in the final week’s polls. In other words, its poll numbers do not fade but instead stay constant post-conventions to the final week.”

This year, it was the Democrats who made the biggest gains from before to after the conventions. Obama is leading by 3 percent in the Real Clear Politics average of polls, about double his lead before the Republican convention. If that doesn’t fade by the end of the week or so — that is, if it proves to be a real lead rather than a post-convention bounce — then there’s simply no example in the past 15 elections of a candidate coming back from a post-convention deficit to win the popular vote.

This is about the point where I’m supposed to write: That said, the race remains close, and the debates are coming soon. It’s still anyone’s game.

But the most surprising of Erikson and Wlezien’s results, and the most dispiriting for the Romney campaign, is that unlike the conventions, the debates don’t tend to matter. There’s “a fairly strong degree of continuity from before to after the debates,” they write. That’s true even when the trailing candidate is judged to have “won” the debates. “Voters seem to have little difficulty proclaiming one candidate the ‘winner’ of a debate and then voting for the opponent,” Erikson and Wlezien say.

Gallup agrees. The august polling firm reviewed the surveys it did before and after every televised presidential debate and concluded they “reveal few instances in which the debates may have had a substantive impact on election outcomes. “

The Romney campaign tends to point to two elections to show how its candidate could win this thing. There’s 1980, when Jimmy Carter supposedly led Ronald Reagan until the debates, and 1988, when Michael Dukakis was leading by 13 points after his convention. In fact, Reagan led going into the 1980 debates. And although Dukakis’s convention bounce was indeed large, it was wiped out by Bush’s convention bounce, which put him back in the lead.

That’s not to say Romney couldn’t win the election. A 3 percent gap is not insurmountable. But we’re quickly approaching a point where his comeback would be unprecedented in modern presidential history. And if the Romney campaign begins to crack under the pressure, then that comeback becomes that much less likely.

#### DOD energy programs don’t link---conservative won’t oppose

Davenport 12

Coral Davenport, energy and environment correspondent for National Journal. Prior to joining National Journal in 2010, Davenport covered energy and environment for Politico, and before that, for Congressional Quarterly. In 2010, she was a fellow with the Metcalf Institute for Marine and Environmental Reporting. From 2001 to 2004, Davenport worked in Athens, Greece, as a correspondent for numerous publications, including the Christian Science Monitor and USA Today, covering politics, economics, international relations and terrorism in southeastern Europe. She also covered the 2004 Olympic Games in Athens, and was a contributing writer to the Fodor’s, Time Out, Eyewitness and Funseekers’ guidebook series. Davenport started her journalism career at the Daily Hampshire Gazette in Northampton, Massachusetts, after graduating from Smith College with a degree in English literature. National Journal, 2/10/12, White House Budget to Expand Clean-Energy Programs Through Pentagon, ProQuest

The White House believes it has figured out how to get more money for clean-energy programs touted by President Obama without having it become political roadkill in the wake of the Solyndra controversy: **Put it in the Pentagon**. While details are thin on the ground, lawmakers who work on both energy- and defense-spending policy believe the fiscal 2013 budget request to be delivered to Congress on Monday probably won't include big increases for wind and solar power through the Energy Department, a major target for Republicans since solar-panel maker Solyndra defaulted last year on a $535 million loan guarantee. But they do expect to see increases in spending on alternative energy in the Defense Department, such as programs to replace traditional jet fuel with biofuels, supply troops on the front lines with solar-powered electronic equipment, build hybrid-engine tanks and aircraft carriers, and increase renewable-energy use on military bases. While Republicans will instantly shoot down requests for fresh spending on Energy Department programs that could be likened to the one that funded Solyndra, many support alternative-energy programs for the military. "I do expect to see the spending," said Rep. Jack Kingston, R-Ga., a member of the House Defense Appropriations Subcommittee, when asked about increased investment in alternative-energy programs at the Pentagon. "I think in the past three to five years this has been going on, but that it has grown as a culture and a practice - and it's a good thing." "If Israel attacks Iran, and we have to go to war - and the Straits of Hormuz are closed for a week or a month and the price of fuel is going to be high," Kingston said, "the question is, in the military, what do you replace it with? It's not something you just do for the ozone. It's strategic." Sen. Lindsey Graham, R-S.C., who sits on both the Senate Armed Services Committee and the Defense Appropriations Subcommittee, said, "I don't see what they're doing in DOD as being Solyndra." "We're not talking about putting $500 million into a goofy idea," Graham told National Journal . "We're talking about taking applications of technologies that work and expanding them. I wouldn't be for DOD having a bunch of money to play around with renewable technologies that have no hope. But from what I understand, there are renewables out there that already work." A senior House Democrat noted that this wouldn't be the first time that the **Pentagon has been utilized to advance policies that wouldn't otherwise be supported**. "They did it in the '90s with medical research," said Rep. Henry Waxman, D-Calif., ranking member of the House Energy and Commerce Committee. In 1993, when funding was frozen for breast-cancer research programs in the National Institutes of Health, Congress boosted the Pentagon's budget for breast-cancer research - to more than double that of the health agency's funding in that area. **Politically, the strategy makes sense**. Republicans are ready to fire at the first sign of any pet Obama program, and renewable programs at the Energy Department are an exceptionally ripe target. That's because of Solyndra, but also because, in the last two years, the Energy Department received a massive $40 billion infusion in funding for clean-energy programs from the stimulus law, a signature Obama policy. When that money runs out this year, a request for more on top of it would be met with flat-out derision from most congressional Republicans. Increasing renewable-energy initiatives at the Pentagon can also help Obama advance his broader, national goals for transitioning the U.S. economy from fossil fuels to alternative sources. As the largest industrial consumer of energy in the world, the U.S. military can have a significant impact on energy markets - if it demands significant amounts of energy from alternative sources, it could help scale up production and ramp down prices for clean energy on the commercial market. Obama acknowledged those impacts in a speech last month at the Buckley Air Force Base in Colorado. "The Navy is going to purchase enough clean-energy capacity to power a quarter of a million homes a year. And it won't cost taxpayers a dime," Obama said. "What does it mean? It means that the world's largest consumer of energy - the Department of Defense - is making one of the largest commitments to clean energy in history," the president added. "That will grow this market, it will strengthen our energy security." Experts also hope that Pentagon engagement in clean-energy technology could help yield breakthroughs with commercial applications. Kingston acknowledged that the upfront costs for alternative fuels are higher than for conventional oil and gasoline. For example, the Air Force has pursued contracts to purchase biofuels made from algae and camelina, a grass-like plant, but those fuels can cost up to $150 a barrel, compared to oil, which is lately going for around $100 a barrel. Fuel-efficient hybrid tanks can cost $1 million more than conventional tanks - although in the long run they can help lessen the military's oil dependence, Kingston said Republicans recognize that the up-front cost can yield a payoff later. "It wouldn't be dead on arrival. But we'd need to see a two- to three-year payoff on the investment," Kingston said. Military officials - particularly Navy Secretary Ray Mabus, who has made alternative energy a cornerstone of his tenure - have been telling Congress for years that the military's dependence on fossil fuels puts the troops - and the nation's security - at risk. Mabus has focused on meeting an ambitious mandate from a 2007 law to supply 25 percent of the military's electricity from renewable power sources by 2025. (Obama has tried and failed to pass a similar national mandate.) Last June, the DOD rolled out its first department-wide energy policy to coalesce alternative and energy-efficient initiatives across the military services. In January, the department announced that a study of military installations in the western United States found four California desert bases suitable to produce enough solar energy - 7,000 megawatts - to match seven nuclear power plants. And so far, those **moves have met with approval from congressional Republicans**. Even so, any request for new Pentagon spending will be met with greater scrutiny this year. The Pentagon's budget is already under a microscope, due to $500 billion in automatic cuts to defense spending slated to take effect in 2013. But even with those challenges, clean-energy spending probably won't stand out as much in the military budget as it would in the Energy Department budget. Despite its name, the Energy Department has traditionally had little to do with energy policy - its chief portfolio is maintaining the nation's nuclear weapons arsenal. Without the stimulus money, last year only $1.9 billion of Energy's $32 billion budget went to clean-energy programs. A spending increase of just $1 billion would make a big difference in the agency's bottom line. But it would probably be easier to tuck another $1 billion or $2 billion on clean-energy spending into the Pentagon's $518 billion budget. Last year, the Pentagon spent about $1 billion on renewable energy and energy-efficiency programs across its departments.

#### The public loves reactors

Christine Todd **Whitman 12**, CASEnergy Co-Chair, Former EPA Administrator and New Jersey Governor, “Nuclear Power Garners Bipartisan Support”, August 13, <http://energy.nationaljournal.com/2012/08/finding-the-sweet-spot-biparti.php?rss=1&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+njgroup-energy+%28Energy+%26+Environment+Experts--Q+with+Answer+Previews%29#2237728>

The energy policy that I’ve seen garner consistent support from the left and the right over the years is also one with which I’m deeply familiar. This policy involves building a diverse portfolio of low-carbon energy sources, featuring a renewed investment in nuclear energy. And it’s not just policymakers from both sides of the aisle who support nuclear energy – it’s everyday energy consumers as well. According to a Gallup poll conducted in March of this year, nearly 60 percent of Americans support the use of nuclear energy to meet our nation’s electricity needs, and a majority support expanding America’s use of nuclear power. Next-generation nuclear energy projects are underway in Georgia, South Carolina and Tennessee, thanks in part to steady popular support, as well as support from President Obama, bipartisan congressional leaders and other policymakers at the federal and state levels. An additional 10 combined construction and operating licenses for 16 plants are under review by the Nuclear Regulatory Commission. This support is founded in the fact that nuclear energy, safely managed, provides an efficient, reliable source of energy. In fact, nuclear power is the only baseload source of carbon-free electricity. It provides nearly two-thirds of the nation’s low-carbon electricity, and will continue to be an important source of energy well into the future given the advent of innovative large and small reactor designs. The use of nuclear energy prevents more than 613 million metric tons of carbon dioxide every year – as much CO2 as is emitted by every passenger car in America. Bipartisan support for nuclear energy also stems from the boost that it provides to local job markets and to local and state economies. As nuclear energy expands and as more than half of the industry workforce approaches retirement, the industry offers growing opportunities for well-paying careers. The industry already supports more than 100,000 jobs, and the combination of retirements and the construction of new facilities could create as many as 25,000 new jobs in the near term. What’s more, the construction of a nuclear facility spurs the creation of other local jobs in industries ranging from manufacturing to hospitality. The industry generates between $40 and $50 billion in revenue and electricity sales, or some $470 million in total economic output and $40 million in labor wages at each U.S. facility every year. That’s a powerful economic engine and a positive impact that leaders are embracing. As America refocuses on cleaner energy policies that help boost our economy, nuclear power is becoming a clear and critical part of a secure, sustainable energy portfolio. We need electricity and we want clean air; with nuclear energy we can have both. It’s a source of power that leaders on both sides of the aisle can support.

## qer

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

King 11

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

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

• Options for construction and operation

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

• Potential energy security advantages

• Additional infrastructure costs

• Effect on the quality of life of military personnel

• Regulatory, state, and local concerns

• Effect on operations on military installations

• Potential environmental liabilities

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

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

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

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

King 11

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

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

#### DoD empirically does not implement energy policy recommendations

DSB 8

Defense Science Board Task Force on DoD Energy Strategy, Feb 2008, More Figh -Less Fuel, www.acq.osd.mil/dsb/reports/ADA477619.pdf

Finding #1: The recommendations from the 2001 Defense Science Board Task Force Report “More Capable Warfighting Through Reduced Fuel Burden” have not been implemented.

The principal finding of the 2001 DSB report was that DoD systematically underestimates the cost of fuel to its tactical forces by failing to recognize the costs of the support structure and the protection necessary to bring that fuel to the systems that use it. As a consequence, significant warfighting, logistics and monetary benefits are available from making weapons systems more fuel-efficient, but those benefits are not valued or emphasized in DoD’s requirements and acquisition processes. The report found that the requirements process does not require energy efficiency in deployed systems, the acquisition process does not value it, so the PPBES process cannot not provide it visibility when considering investment decisions.

These findings remain valid today. Few of the recommendations of that study have been implemented to date. Those that have begun; making energy efficiency a selective Key Performance Parameter in system design, and using the fully burdened cost of fuel in life cycle costing of alternative systems; are in their early stages of implementation. Focused leadership will be required to complete the recommendations of the 2001 study and similar recommendations made herein.

#### Delay

Moniz 12

Ernest Moniz, Cecil and Ida Green Professor of Physics and Engineering Systems and Director of the Energy Initiative at the Massachusetts Institute of Technology; Former Clinton Administration Under Secretary of the Department of Energy and as Associate Director for Science in the Office of Science and Technology Policy ; serves on the President’s Council of Advisors on Science and Technology, 11/15/11, Quadrennial Energy and Technology Reviews, web.mit.edu/mitei/views/testimony/111115-quadrennial-energy-and-technology-reviews.html

S.1703 would legislate the QER as a required submission to the Congress, providing "an integrated view of national energy objectives and Federal energy policy, including alignment of research programs, incentives, regulations, and partnerships." Clearly this is in accord with the intentions put forward in the PCAST report. An interagency working group would be established at the beginning of each Administration, with the QER due one year later. This date is displaced by one year from that recommended by PCAST. In steady state, this shift by one year is quite reasonable. My concern is whether the first QER can be put together well by early 2014, given that the entire process needs to be invented. This can be ameliorated to some extent if the buildup of analytical capabilities and process development are funded and pursued aggressively in 2012.

#### No implementation

Barlas 12

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

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

## qer – ptx

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

PCAST 10

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

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

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

## workforce da

#### No extinction

Malcolm **Gladwell**, writer for The New Yorker and best-selling author The New Republic, July 17 and 24, 19**95**, excerpted in Epidemics: Opposing Viewpoints, 1999, p. 31-32

Every infectious agent that has ever plagued humanity has had to adapt a specific strategy but every strategy carries a corresponding cost and this makes human counterattack possible. Malaria is vicious and deadly but it relies on mosquitoes to spread from one human to the next, which means that draining swamps and putting up mosquito netting can all hut halt endemic malaria. Smallpox is extraordinarily durable remaining infectious in the environment for years, but its very durability its essential rigidity is what makes it one of the easiest microbes to create a vaccine against. AIDS is almost invariably lethal because it attacks the body at its point of great vulnerability, that is, the immune system, but the fact that it targets blood cells is what makes it so relatively uninfectious. Viruses are not superhuman. I could go on, but the point is obvious. Any microbe capable of wiping us all out would have to be everything at once: as contagious as flue, as durable as the cold, as lethal as Ebola, as stealthy as HIV and so doggedly resistant to mutation that it would stay deadly over the course of a long epidemic. But viruses are not, well, superhuman. They cannot do everything at once. It is one of the ironies of the analysis of alarmists such as Preston that they are all too willing to point out the limitations of human beings, but they neglect to point out the limitations of microscopic life forms.

#### Prefer our ev-public health authorities have an incentive to massively exaggerate pandemic scenarios

Michael **Fitzpatrick**, General Practitioner @ Barton House Health Center, November 20**10**. “Pandemic Flu: Public Health and the Culture of Fear”

http://www.rsis.edu.sg/NTS/resources/research\_papers/NTS%20Working%20Paper2.pdf

Projections by leading public health officials of rates of disease and death from pandemic flu on a catastrophic scale had a major impact. While WHO experts such as Keiji Fukuda speculated that global death rates would be in the millions, if not tens of millions, television reports featured images of the 1918-19 pandemic and accounts of the devastating effects of that (historically unprecedented) viral pestilence.10 Patients fearful for their own healtn and that of their children, their elderly relatives, and family members with chronic illnesses sought medical advice and whatever preventative measures were available. There is however little evidence that raising awareness of the emerging threat of swine flu had any protective value. Given the rapid spread of the virus, it appears than none of the measures taken in the early 'containment' phase of the outbreak, such as more assiduous hand-washing, face masks, social distancing measures (school closures, etc.) and the provision of prophylactic antivirals to contacts had an appreciable effect on its spread. Pregnant women, deemed to be particularly at risk, were particularly susceptible to pandemic fears - and their anxieties were subsequently compounded by the development of vaccines that rival scaremongers claimed were unsafe. It soon emerged that early reports from Mexico provided unreliable figures for deaths resulting from swine flu and an uncertain number of cases of infection to use as a denominator with which to calculate the mortality rate. As it also became clear that most cases were mild, projections for the impact of the pandemic were steadily scaled down." In July, British authorities anticipated that 30 per cent of the population (19 million people) would become infected, with a complication rate of 15 per cent, a hospitalisation rate of 2 per cent and a death rate between 0.1 per cent and 0.35 per cent (between 19,000 and 65,000 people). By September the figure of 19,000 had become the worst-case scenario; the following month this was reduced to 1,000. In December, the official report on the mortality statistics for the first six months of the pandemic in England estimated a mortality rate of 0.026 per cent (138 confirmed deaths, and cases of swine flu in 1 per cent of the population), a rate substantially lower than the most optimistic scenario of six months earlier.12 The contrast with earlier influenza pandemics was dramatic: the death rate in 1918-19 was 2-3 per cent, and that in the less severe pandemics of 1957-58 and 1967-68 around 0.2 per cent. In the judgement of the Hine Report, ministers and officials placed excessive faith in mathematical modelling. They had come to regard this as 'hard, quantitative science' that could provide 'easily understandable figures' which had the aura of appearing 'scientifically very robust'.13 Though the mathematicians had warned, at the first pandemic planning meeting in April, that in the absence of reliable data their modelling capability was low, they were under pressure from the politicians to 'produce forecasts'. The high level of uncertainty surrounding these projections does not seem to have deterred the modellers from producing them or the politicians from projecting them into the public realm. The Hine Report observes that by the end of the first wave of swine flu cases in September, sufficient data were available to guarantee accurate modelling of the second wave. However, official statements still sought to warn against complacency about future dangers and did nothing to allay the anxieties provoked by earlier doomsday scenarios. The Hine Report is critical of the public promotion of 'reasonable worst-case scenarios', which imply 'a reasonably likely event', focusing in particular on CMO Professor Liam Donaldson's July statement. The report says: The English CMO's citing of the 'reasonable worst-case' planning assumption of 65,000 fatalities on 16 July 2009 was widely reported in headlines in somewhat alarmist terms.14 It seems unfair to blame the media for the alarmist tone of their reports, when it was echoed by the newly appointed health minister Andy Bumham, who told parliament that the swine flu pandemic could no longer be controlled and that there could be 100,000 cases a day by the end of August. It is striking that British authorities chose to promote such gloomy projections at a time when other prominent health figures had already declared such figures improbable. A month earlier, on the occasion of declaring the swine flu outbreak a global pandemic, WHO chief Margaret Chan had already recognised that most cases were mild and that she did not expect to see a sudden and dramatic jump in severe or fatal infections.15 While the Hine Report is generally highly congratulatory of the UK response to the swine flu pandemic, it suggests that the authorities may have adhered too strictly to the contingency plan they had developed over the previous decade to cope with the emergence of an influenza pandemic on the scale of the 1918-19 outbreak. As a result they 'did not consider sufficiently the possibility that a pandemic might be far less severe' than the one envisioned in that contingency plan. Their response was 'tailored to the plan, not the nature of the virus' and thus lacked flexibility. The report tentatively suggests that the authorities might consider as an alternative approach, a policy of preparing for the most likely outcome, while being prepared to monitor and change tack as necessary. The alarmist response to the swine flu outbreak reflects the wider trend of the past decade in which 'crying wolf has emerged as the appropriate official response to diverse real and imaginary threats, from the millennium bug to bioterrorism, obesity to global warming.'5 For the authorities, the over-riding principle is to avoid blame for unforeseen disasters, by always proclaiming the worst-case scenario and repeating the mantra 'prepare for the worst, hope for the best'. From this perspective, rational contingency planning gives way to scaremongering. Instead of making discreet preparations for probable, predictable emergencies (snow in winter, drought in summer), the authorities engage in speculation about the grimmest possible eventualities (massive loss of life resulting from disease or climate change) with the aim of promoting more responsible behaviour and healthier lifestyles.17 Rather than communicating realistic assessments of risk to the public, the authorities engage in sharing their anxieties and promoting fears. Instead of guiding practical professional interventions in response to real social problems, politicians and public health officials engage in dramatic posturing.

#### They have the personnel

Robitaille 12

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

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

#### No workforce crisis

Hosek, National Defense Research Institute at RAND, PhD Economics @ Chicago, ‘8

(James, and Titus Galama, “U.S. Competitiveness in Science and Technology,” <http://www.rand.org/pubs/monographs/2008/RAND_MG674.pdf>)

We consider two indicators of shortage—unusually low unemployment and high wage growth for scientists and engineers—and we make comparisons relative to past trends within science and engineering and relative to other high-skill occupations. These are only broad indicators. There may be no broad evidence of a shortage, yet a shortage could be present at a micro-level—for instance, at a particular moment a firm can have difficulty finding enough qualified engineers to meet its hiring requirements. If micro-level shortages were widely present and persistent, they would result in lower unemployment and faster wage growth, as firms adjusted their hiring standards and wage offers.

The unemployment rate has been the same in S&E occupations as in non-S&E occupations, except during the 1991 recession and the years following the end of the dot.com boom at the end of the 1990s, when the S&E unemployment rate was higher (see Figure 3.17). The greater cyclical sensitivity of S&E unemployment in 1991 and the early 2000s deserves further investigation, but it might be related to the rapid expansion in employment that occurred in information technology (see below). Workers not educated in S&E may have entered occupations classified as “computer science” or “information technology” and been counted as S&E workers, yet were more expendable by firms hit hard by the downturn.

Figure 3.18 presents a three-year moving average of the median salary from 1989 to 2004 for workers with at least a bachelor’s degree, with separate trend lines for scientists and engineers, lawyers, doctors and other non-S&E occupations. Doctors, lawyers, and many scientists and engineers have a professional degree or a doctorate in addition to a bachelor’s degree, so it is not surprising that their median salaries are higher than for other non-S&E occupations. But the figure is useful in showing the change in median salary over time, where we find average annual increases of 1.8 percent for doctors and 0.8 percent for lawyers compared with 0.9 percent for scientists and engineers, over 1995 to 2005. Salaries in non-S&E occupations excluding lawyers and medical doctors grew at only 0.3 percent per year. In sum, unemployment and wage growth patterns are thus not unusual and do not point to the presence of a chronic or cyclical shortage in S&E. Indeed, Trivedi (2006) argues that there is an oversupply of PhDs in the life sciences.

## water wars

SMRs solve water scarcity – turns disease

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**.”

## method focus bad

#### 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.

## threat con

#### No impact – threat construction isn’t sufficient to cause wars

**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.

## structural violence

#### War turns structural violence

Bulloch 8

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But the idea that poverty and peace are directly related presupposes that wealth inequalities are – in and of themselves – unjust, and that the solution to the problem of war is to alleviate the injustice that inspires conflict, namely poverty. However, it also suggests that poverty is a legitimate inspiration for violence, otherwise there would be no reason to alleviate it in the interests of peace. It has become such a commonplace to suggest that poverty and conflict are linked that it rarely suffers any examination. To suggest that war causes poverty is to utter an obvious truth, but to suggest the opposite is – on reflection – quite hard to believe. War is an expensive business in the twenty-first century, even asymmetrically. And just to examine Bangladesh for a moment is enough at least to raise the question concerning the actual connection between peace and poverty. The government of Bangladesh is a threat only to itself, and despite 30 years of the Grameen Bank, Bangladesh remains in a state of incipient civil strife. So although Muhammad Yunus should be applauded for his work in demonstrating the efficacy of micro-credit strategies in a context of development, it is not at all clear that this has anything to do with resolving the social and political crisis in Bangladesh, nor is it clear that this has anything to do with resolving the problem of peace and war in our times. It does speak to the Western liberal mindset – as Geir Lundestad acknowledges – but then perhaps this exposes the extent to which the Peace Prize itself has simply become an award that reflects a degree of Western liberal wish-fulfilment. It is perhaps comforting to believe that poverty causes violence, as it serves to endorse a particular kind of concern for the developing world that in turn regards all problems as fundamentally economic rather than deeply – and potentially radically – political.

#### Their conception of violence is reductive and can’t be solved

Boulding 77

Twelve Friendly Quarrels with Johan Galtung

Author(s): Kenneth E. BouldingReviewed work(s):Source: Journal of Peace Research, Vol. 14, No. 1 (1977), pp. 75-86Published

Kenneth Ewart Boulding (January 18, 1910 – March 18, 1993) was an economist, educator, peace activist, poet, religious mystic, devoted Quaker, systems scientist, and interdisciplinary philosopher.[1][2] He was cofounder of General Systems Theory and founder of numerous ongoing intellectual projects in economics and social science.

He graduated from Oxford University, and was granted United States citizenship in 1948. During the years 1949 to 1967, he was a faculty member of the University of Michigan. In 1967, he joined the faculty of the University of Colorado at Boulder, where he remained until his retirement.

Finally, we come to the great Galtung metaphors of 'structural violence' 'and 'positive peace'. They are metaphors rather than models, and for that very reason are suspect. Metaphors always imply models and metaphors have much more persuasive power than models do, for models tend to be the preserve of the specialist. But when a metaphor implies a bad model it can be very dangerous, for it is both persuasive and wrong. The metaphor of structural violence I would argue falls right into this category. The metaphor is that poverty, deprivation, ill health, low expectations of life, a condition in which more than half the human race lives, is 'like' a thug beating up the victim and 'taking his money away from him in the street, or it is 'like' a conqueror stealing the land of the people and reducing them to slavery. The implication is that poverty and its associated ills are the fault of the thug or the conqueror and the solution is to do away with thugs and conquerors. While there is some truth in the metaphor, in the modern world at least there is not very much. Violence, whether of the streets and the home, or of the guerilla, of the police, or of the armed forces, is a very different phenomenon from poverty. The processes which create and sustain poverty are not at all like the processes which create and sustain violence, although like everything else in 'the world, everything is somewhat related to everything else. There is a very real problem of the structures which lead to violence, but unfortunately Galitung's metaphor of structural violence as he has used it has diverted attention from this problem. Violence in the behavioral sense, that is, somebody actually doing damage to somebody else and trying to make them worse off, is a 'threshold' phenomenon, rather like the boiling over of a pot. The temperature under a pot can rise for a long time without its boiling over, but at some 'threshold boiling over will take place. The study of the structures which underlie violence are a very important and much neglected part of peace research and indeed of social science in general. Threshold phenomena like violence are difficult to study because they represent 'breaks' in the systenm rather than uniformities. Violence, whether between persons or organizations, occurs when the 'strain' on a system is too great for its 'strength'. The metaphor here is that violence is like what happens when we break a piece of chalk. Strength and strain, however, especially in social systems, are so interwoven historically that it is very difficult to separate them. The diminution of violence involves two possible strategies, or a mixture of the two; one is Ithe increase in the strength of the system, 'the other is the diminution of the strain. The strength of systems involves habit, culture, taboos, and sanctions, all these 'things which enable a system to stand lincreasing strain without breaking down into violence. The strains on the system 'are largely dynamic in character, such as arms races, mutually stimulated hostility, changes in relative economic position or political power, which are often hard to identify. Conflicts of interest 'are only part 'of the strain on a system, and not always the most important part. It is very hard for people ito know their interests, and misperceptions of 'interest take place mainly through the dynamic processes, not through the structural ones. It is only perceptions of interest which affect people's behavior, not the 'real' interests, whatever these may be, and the gap between percepti'on and reality can be very large and resistant to change. However, what Galitung calls structural violence (which has been defined 'by one unkind commenltator as anything that Galitung doesn't like) was originally defined as any unnecessarily low expectation of life, on that assumption that anybody who dies before the allotted span has been killed, however unintentionally and unknowingly, by somebody else. The concept has been expanded to include all 'the problems of poverty, destitution, deprivation, and misery. These are enormously real and are a very high priority for research and action, but they belong to systems which are only peripherally related to 'the structures whi'ch produce violence. This is not rto say that the cultures of violence and the cultures of poverty are not sometimes related, though not all poverty cultures are cultures of violence, and certainly not all cultures of violence are poverty cultures. But the dynamics lof poverty and the success or failure to rise out of it are of a complexity far beyond anything which the metaphor of structural violence can offer. While the metaphor of structural violence performed a service in calling attention to a problem, it may have d'one a disservice in preventing us from finding the answer.

## technocracy

#### 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.

## klare

We solve the environment

Klare 12

Michael T. Klare, Five Colleges professor of Peace and World Security Studies, whose department is located at Hampshire College, The Nation, May 10, 2012, "The Energy Wars Heat Up", http://www.thenation.com/article/167823/energy-wars-heat#

How Energy Drives the World All of these disputes have one thing in common: the conviction of ruling elites around the world that the possession of energy assets—especially oil and gas deposits—is essential to prop up national wealth, power and prestige. This is hardly a new phenomenon. Early in the last century, Winston Churchill was perhaps the first prominent leader to appreciate the strategic importance of oil. As First Lord of the Admiralty, he converted British warships from coal to oil and then persuaded the cabinet to nationalize the Anglo-Persian Oil Company, the forerunner of British Petroleum (now BP). The pursuit of energy supplies for both industry and war-fighting played a major role in the diplomacy of the period between the World Wars, as well as in the strategic planning of the Axis powers during World War II. It also explains America’s long-term drive to remain the dominant power in the Persian Gulf that culminated in the first Gulf War of 1990-91 and its inevitable sequel, the 2003 invasion of Iraq. The years since World War II have seen a variety of changes in the energy industry, including a shift in many areas from private to state ownership of oil and natural gas reserves. By and large, however, the industry has been able to deliver ever-increasing quantities of fuel to satisfy the ever-growing needs of a globalizing economy and an expanding, rapidly urbanizing world population. So long as supplies were abundant and prices remained relatively affordable, energy consumers around the world, including most governments, were largely content with the existing system of collaboration among private and state-owned energy leviathans. But that energy equation is changing ominously as the challenge of fueling the planet grows more difficult. Many of the giant oil and gas fields that quenched the world’s energy thirst in years past are being depleted at a rapid pace. The new fields being brought on line to take their place are, on average, smaller and harder to exploit. Many of the most promising new sources of energy—like Brazil’s “pre-salt” petroleum reserves deep beneath the Atlantic Ocean, Canadian tar sands and American shale gas—require the utilization of sophisticated and costly technologies. Though global energy supplies are continuing to grow, they are doing so at a slower pace than in the past and are continually falling short of demand. All this adds to the upward pressure on prices, causing anxiety among countries lacking adequate domestic reserves (and joy among those with an abundance). The world has long been bifurcated between energy-surplus and energy-deficit states, with the former deriving enormous political and economic advantages from their privileged condition and the latter struggling mightily to escape their subordinate position. Now, that bifurcation is looking more like a chasm. In such a global environment, friction and conflict over oil and gas reserves—leading to energy conflicts of all sorts—is only likely to increase. Looking, again, at April’s six energy disputes, one can see clear evidence of these underlying forces in every case. South Sudan is desperate to sell its oil in order to acquire the income needed to kick-start its economy; Sudan, on the other hand, resents the loss of oil revenues it controlled when the nation was still united and appears no less determined to keep as much of the South’s oil money as it can for itself. China and the Philippines both want the right to develop oil and gas reserves in the South China Sea, and even if the deposits around Scarborough Shoal prove meager, China is unwilling to back down in any localized dispute that might undermine its claim to sovereignty over the entire region. Egypt, although not a major energy producer, clearly seeks to employ its oil and gas supplies for maximum political and economic advantage—an approach sure to be copied by other small and mid-sized suppliers. Israel, heavily dependent on imports for its energy, must now turn elsewhere for vital supplies or accelerate the development of disputed, newly discovered offshore gas fields, a move that could provoke fresh conflict with Lebanon, which says they lie in its own territorial waters. And Argentina, jealous of Brazil’s growing clout, appears determined to extract greater advantage from its own energy resources, even if this means inflaming tensions with Spain and Great Britain. And these are just some of the countries involved in significant disputes over energy. Any clash with Iran—whatever the motivation—is bound to jeopardize the petroleum supply of every oil-importing country, sparking a major international crisis with unforeseeable consequences. China’s determination to control its offshore hydrocarbon reserves has pushed it into conflict with other countries with offshore claims in the South China Sea and into a similar dispute with Japan in the East China Sea. Energy-related disputes of this sort can also be found in the Caspian Sea and in globally warming, increasingly ice-free Arctic regions. The seeds of energy conflicts and war sprouting in so many places simultaneously suggest that we are entering a new period in which key state actors will be more inclined to employ force—or the threat of force—to gain control over valuable deposits of oil and natural gas. In other words, we’re now on a planet heading into energy overdrive.

## 1ar

## at: no extinction

#### Prolif shootouts cause nuclear winter

Westberg 9

Gunnar Westberg, Sahlgren Academy of Medicine Professor Emeritus, International Physicians for the Prevention of Nuclear War Former President, 2009,”Conference on an Arctic NWFZ,” <http://www.lulu.com/product/download/conference-on-an-arctic-nwfz/5510230>

Today the risk of a “smaller” nuclear war increases because of the proliferation of nuclear weapons. The presence of nuclear weapons in the Arctic region would increase the risk of such a limited nuclear conflict. In my presentation I will show that even such a “small” nuclear war would produce severe global environmental consequences. As an example of such a limited conflict I will describe the climate effect of nuclear war between India and Pakistan. In the 1980-ies the concept of nuclear winter was brought into our discussions. It was shown that a large nuclear war in which a major part of the nuclear arsenal was used would result in a drop in global temperatures of 7-10 degrees Celsius for several years. Most of those who survived the war, anywhere on the globe, would die from starvation. That means that if a state “won” the war through a devastating first strike, the population of that state would also succumb. Victory would mean suicide. In the last 25 years the nuclear arsenals have been much decreased. It has been argued that because of this decreased number of nuclear charges a nuclear winter would no longer be a consequence of a nuclear war. However, recent studies have shown the opposite. Observations after large forest fires show that the nuclear darkness would last longer than we previously thought. In a large fire a dark cloud of soot rises rapidly up to about 10 km altitude. The news is that it does not stay there. The cloud is heated by the sun and then rises up to the stratosphere. As very little material from the stratosphere rains down, the soot stays there and is distributed around the globe in a year or two. The increased darkness of the stratosphere clouds will remain for many years 1 . Extensive calculations using big computers and three-dimensional models of the atmosphere have been used to predict the development. Thus a large nuclear war between Russia and the US, when many of the nuclear weapons are brought to explode over populations centers, is expected to release 150 Tg of soot (teragrams, one Tg equals one million metric tons). Most of that material will end up in the stratosphere. The result would be a drop in global temperatures of 7-10 degrees Celsius over 5-10 years. A more limited exchange, using mainly the nuclear weapon carried on intercontinental missiles, of which some will not target areas close to large cities, might result in a release of 50 Tg of soot, resulting in a drop in global average temperature of around 4 degrees Celsius (Fig.1). In both these scenarios we can expect that the global consequences will be devastating. Even the “victorious” country most if not all people will succumb to the secondary consequences of the nuclear war - radiation, famine, epidemics, social disintegration, and despair. Global climate consequences of a regional nuclear war A certain number of small weapons will have much greater consequences, both in the number of people killed from the explosions and in the amount of soot produced, than a smaller number of larger bombs with the same total explosive force2 . The new insights into the circulation of the atmosphere have also shown that a limited nuclear war, such a war between India and Pakistan when about 100 Hiroshima-size, 15 kt bombs are used, mostly over population centers, would result in the release of about 5 Tg of soot.. This soot, mostly from burning cities, would decrease the global temperature by about 1.25 degrees C, over 6-8 years. That is not nuclear winter, but the nuclear darkness will cause a deeper drop in temperature than at any time during the last 1000 years. The temperature over the continents would decrease substantially more than the global average. A decrease in rainfall over the continents would also follow. (Fig.2, 3) The growing season would be shortened by 10 to 20 days in many of the most important grain producing areas in the world which might completely eliminate some crops that have insufficient time to reach maturity. (Fig.4). An accurate evaluation of the global decrease in food production has yet to be done, but there will be substantial deficits3 . In earlier periods we have seen that a global decrease in grain production of 5% over a couple of years will bring about a sharp increase in prices and a starvation will increase in countries that normally are dependent on the import of food. The period of nuclear darkness will cause much greater decrease in grain production than 5%, and it will continue over many years. The reserves of the most important grains in the world have in recent years been less than corresponding to six weeks of consumption4 . There are currently more than 800 million people in the world who are chronically malnourished. Several hundred million more live in countries which are dependent on imported grain for their survival. In a situation of severe food shortage globally, can we expect that the wealthy countries will accept to tighten their belts to such an extent that the poor and undernourished survive these seven years of famine? If not, hundreds of millions of people in many continents, in particular Africa, will die from hunger5 . In the war zone, India and Pakistan, it can be expected that 20 million people will die from blast and fire, millions more from the radioactive fallout. Many tens of millions will flee the contaminated areas. and many will die from epidemics and hunger, maybe more than from the bombs. But the greatest number of fatalities will occur in countries far away, who will succumb from starvation because of the global nuclear darkness 6 . Severe ozone depletion To make matters even worse, such amounts of smoke injected into the stratosphere would cause a huge reduction in the Earth’s protective ozone (Mills et al 2008). A study published two years ago by the National Academy of Sciences, using a similar nuclear war scenario involving 100 Hiroshima-size bombs, shows ozone losses in excess of 20% globally, 25-45% at mid latitudes, and 50-70% at northern high latitudes persisting for five years, with substantial losses continuing for five additional years (Fig.5). The resulting increases in UV radiation would have serious consequences for human health. Here in Copenhagen we would be advised not to be outdoors for several hours around the middle of the day. The effects on the agriculture, on animals, on economy and on the human population from this unprecedented increase in ultraviolet radiation have not yet been evaluated. The effects would undoubtedly be serious. A regional nuclear war would result in an unprecedented global catastrophe. I have decided to present this material at this conference because it shows the global consequences of any nuclear war, even a war in which less than one half on one percent of the nuclear weapons are used. Nuclear proliferation is a threat to all of us. Nuclear weapons in the Arctic zone would increase the danger of a nuclear confrontation. And most importantly, it is not sufficient to decrease the number of nuclear weapons to a few hundred. They must be abolished.

## 2NC No Extinction

#### Disease can’t cause extinction – it’s genetically impossible

Richard Posner, Senior Lecturer in Law at the University of Chicago, judge on the United States Court of Appeals for the Seventh Circuit, January 1, 2005, Skeptic, “Catastrophe: the dozen most significant catastrophic risks and what we can do about them,” <http://goliath.ecnext.com/coms2/gi_0199-4150331/Catastrophe-the-dozen-most-significant.html#abstract>

Yet the fact that Homo sapiens has managed to survive every disease to assail it in the 200,000 years or so of its existence is a source of genuine comfort, at least if the focus is on extinction events. There have been enormously destructive plagues, such as the Black Death, smallpox, and now AIDS, but none has come close to destroying the entire human race. There is a biological reason. Natural selection favors germs of limited lethality; they are fitter in an evolutionary sense because their genes are more likely to be spread if the germs do not kill their hosts too quickly. The AIDS virus is an example of a lethal virus, wholly natural, that by lying dormant yet infectious in its host for years maximizes its spread. Yet there is no danger that AIDS will destroy the entire human race. The likelihood of a natural pandemic that would cause the extinction of the human race is probably even less today than in the past (except in prehistoric times, when people lived in small, scattered bands, which would have limited the spread of disease), despite wider human contacts that make it more difficult to localize an infectious disease. The reason is improvements in medical science. But the comfort is a small one. Pandemics can still impose enormous losses and resist prevention and cure: the lesson of the AIDS pandemic. And there is always a lust time.

#### Humans can respond effectively

**Wills 96** (Christopher, Professor of Biology at the University of California Yellow Fever, Black Goddess)

I am confident that **no terrible disease will appear that slaughters us by the billion**. The reason is that we can now respond very quickly to such a visible enemy. Any disease that spreads like wildfire will have to go so through the air or water and there are many steps we can take right away to prevent such a spread. If the people of fourteenth-century Europe had known what we know now, they could have halted the black death in short order.

#### Antibiotic use doesn’t spike resistance

Thomas, M.E., et al., 08 ("Risk factors for the introduction of high pathogenicity Avian Influenza virus into poultry farms during the

epidemic in the Netherlands in 2003." Preventive veterinary medicine 69, (10 June 2005): 1-11. Agricola. EBSCO. [1 Aug. 2008, <http://search.ebscohost.com/login.aspx?direct=true&db=agr&AN=IND43716042&site=ehost-live>]

With the exception of ciprofloxacin resistance, there is a paucity of scientific evidence to document the association of antimicrobial agents used in veterinary medicine with increases in antimicrobial-resistant pathogens (Phillips et al., 2004). For example, it has been suggested that the increased prevalence of extended-spectrum cephalosporin-resistant strains is in part related to the use in food animals of ceftiofur, which is an extended-spectrum cephalosporin approved for use in veterinary medicine (White et al., 2001); however, scientific evidence is lacking. Antimicrobial agents used for intensive calf rearing in the 1970–1980s have also been speculated to contribute to the emergence of multiple-antibiotic resistant Salmonella Typhimurium DT104 strains. Genes included in the antibiotic resistance gene cluster of Salmonella Typhimurium DT104 confer resistance to four of the five antimicrobials used during that time to treat veal calves, therefore co-selection of the entire cluster could have arisen from the use of any one of those drugs (Velge, Cloeckaert, & Barrow, 2005). While there is no definitive evidence for this scenario, several reviews have been published presenting contrasting views regarding the role of veterinary usage of antimicrobials in the emergence of antibiotic-resistant foodborne pathogens. In support of a causal relationship are reviews by Angulo et al., 2004 and Mølbak, 2004, whereas reviews by Phillips et al., 2004 and Wassenaar, 2005 advocate that veterinary usage of antimicrobial agents are inaccurately incriminated as being a major contributor to antibiotic-resistant pathogens in humans. Debate on this topic will continue but should consider the additional routes which lead to resistant bacterial populations, that antimicrobial usage in animals is required for animal health and well-being, and that not every antimicrobial-resistant pathogen has human health consequences. On this latter point, clearly not all infections caused by resistant pathogens fail to respond to treatment. For example, in a study of 23 diarrhea cases in Thailand, nearly all were infected with ciprofloxacin-resistant Campylobacter, yet 58% of patients receiving ciprofloxaxin treatment were cured. This response implies that treatment with ciprofloxacin could still be effective in many cases (Sanders et al., 2002). Another consideration is that acquisition of drug resistance could entail a biological cost to the pathogen resulting in reduced fitness and competitiveness in the absence of antibiotic selection pressure. For example, most data on E. coli suggest that increased antibiotic resistance results in decreased fitness (Wassenaar, 2005). Alternatively, for some foodborne pathogens such as fluoroquinolone-resistant C. jejuni, resistance can be neutral or even beneficial in terms of fitness (Luo et al., 2005). When coinoculated into chickens, fluoroquinolone-resistant Campylobacter isolates either outcompeted or were outcompeted by most of the fluoroquinolone-susceptible strains, with the outcome being dependent on the genetic background of the recipient strain. These variable results highlight the complex nature of antibiotic resistance and the large data gaps that exist in making informed scientific decisions on use of antimicrobials in animals used for food.

## 2NC Adaptation

#### Adaptation solves

**Gladwell, 1999**

Malcolm Gladwell, The New Republic, July 17 and 24, 1995, excerpted in Epidemics: Opposing Viewpoints, 1999, p. 29

In Plagues and Peoples, which appeared in 1977. William MeNeill pointed out that…while man’s efforts to “remodel” his environment are sometimes a source of new disease. they are seldom a source of serious epidemic disease. Quite the opposite. As humans and new microorganisms interact, they begin to accommodate each other. Human populations slowly build up resistance to circulating infections. What were once virulent infections, such as syphilis become attenuated. Over time, diseases of adults, such as measles and chicken pox, become limited to children, whose immune systems are still naïve.

## 2NC People Solve

**New cures solve all diseases**

**ASNS, 2008**

ASNS, Africa Science News Service, Uganda, 9-15-2008, AIDS cure may lie in supercharged "mineral water"

Antibiotics and vaccines that prompt side effects, genetic mutations, and resistant germs may soon be obsolete pending the results of an AIDS trial sponsored by volunteers, humanitarian groups, and The Republic of Uganda. At the Victoria Medical Center, in this nation at the epicenter of the pandemic, a new type of "mineral water" will be tested to compete with the drug industry's most profitable weapons against disease. As governments worldwide are stockpiling defenses against bioterrorist attacks and deadly new outbreaks, Uganda will test a new possible cure for infectious diseases made from energized water and silver. It is called UPCOSHTM, short for "Uniform Picoscaler Concentrated Oligodynamic Silver Hydrosol." OXYSILVERTM is the leading brand. The base formula was developed by NASA scientists to protect astronauts in space. The solution of pure water and energized silver and oxygen uniquely boasts a covalent electromagnetic bond between these two non-toxic elements that kills most harmful germs, oxygenates the blood, alkalines the body, helps feed essential nutrients to healthy cells and desirable digestive bacteria, and even relays a musical note upon which active DNA depends. These factors are crucial for developing mega-immunity and winning the war against cancer and infectious diseases experts say. According to the product's developers, including famous health scientists, this entirely new class of liquids and gels is performing "miraculously" in killing HIV, the AIDS virus, tuberculosis, and malaria in initial tests. Africa's greatest killers (after starvation, dehydration, and resulting immunological destruction) are no match for a few drops of UPCOSHTM. Even using a germ infested glass, as is commonly the case in the poorest communities, you need not fear. This water safely disinfects everything it touches. Ugandan officials were encouraged by the nation's leading AIDS activist, Peter Luyima, co-founder of the WASART African Youth Movement, to study OXYSILVERTM. Mr. Luyima invited several humanitarian doctors, researchers, organizations, and corporations to sponsor this promising human experiment on 70 terminally-ill patients. If successful, the government plans to grant funding to Mr. Luyima's youth organization to establish an OXYSILVERTM manufacturing plant to supply this life-saving liquid to distributors across Africa. "Better late than never, OXYSILVERTM may prove to be civilization's greatest hope for surviving against the current and coming plagues," says Dr. Leonard Horowitz, an award-winning public health and emerging diseases expert who contributed to the product's electro-genetic formulation. Author of the American bestseller, Emerging Viruses: AIDS & Ebola--Nature, Accident or Intentional?, and the scientific text, DNA: Pirates of the Sacred Spiral, Dr. Horowitz is most critical of the drug cartel profiting from humanity's suffering.

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#### Incentives now

Kramer 12

David Kramer, Physics Today, Sept 2012, Romney, Obama surrogates spell out candidates’ energy policies, www.physicstoday.org/resource/1/phtoad/v65/i9/p20\_s1

Both candidates favor growth in nuclear energy, and both support loan guarantees to back the initial deployment of advanced reactors. Stuntz said Romney would take steps to lower the cost of building new plants, “whether that means modular reactors that can be approved and rolled out in more cookie-cutter fashion . . . or whether that means smaller reactors.”

The Obama administration’s support for nuclear power is evident from the $7 billion loan guarantee from DOE to back construction of two new reactors at an existing nuclear power plant in Georgia, Reicher noted. “**There’s serious money going into small modular reactors** and serious policy work going on in how to reform the licensing process” at the Nuclear Regulatory Commission to expedite approval.

#### Federal SMR loans coming—announced in September

Energy Collective 12

Energy Collective, 7/26/12, Race for DOE SMR money heats up, theenergycollective.com/dan-yurman/97081/race-doe-smr-money-heats

The Department of Energy is reviewing proposals from B&W and several other SMR firms to be granted up to $452 million over five years to support SMR engineering and licensing work. The agency will make up to two awards by the end of September this year.