## plan

#### The United States Federal Government should obtain electricity from small modular reactors for its military installations in the United States.

## solvency

#### DOD SMR acquisition accelerates commercialization and solves adoption

CSPO 10, Consortium for Science, Policy and Outcomes at ASU, “four policy principles for energy innovation & climate change: a synthesis”, June, <http://www.catf.us/resources/publications/files/Synthesis.pdf>

Government purchase of new technologies is a powerful way to accelerate innovation through increased demand (Principle 3a). We explore how this principle can be applied by considering how the DoD could purchase new nuclear reactor designs to meet electric power needs for DoD bases and operations. Small modular nuclear power reactors (SMRs), which generate less than 300 MW of power (as compared to more typical reactors built in the 1000 MW range) are often listed as a potentially transformative energy technology. While typical traditional large-scale nuclear power plants can cost five to eight billion dollars, smaller nuclear reactors could be developed at smaller scale, thus not presenting a “bet the company” financial risk. SMRs could potentially be mass manufactured as standardized modules and then delivered to sites, which could significantly reduce costs per unit of installed capacity as compared to today’s large scale conventional reactor designs. It is likely that some advanced reactors designs – including molten salt reactors and reactors utilizing thorium fuels – could be developed as SMRs. Each of these designs offers some combination of inherently safe operation, very little nuclear proliferation risk, relatively small nuclear waste management needs, very abundant domestic fuel resources, and high power densities – all of which are desirable attributes for significant expansion of nuclear energy. Currently, several corporations have been developing small nuclear reactors. Table 2 lists several of these companies and their reactor power capacities, as well as an indication of the other types of reactor innovations that are being incorporated into the designs. Some of these technologies depend on the well-established light water reactor, while others use higher energy neutrons, coolants capable of higher temperature operation, and other innovative approaches. Some of these companies, such as NuScale, intend to be able to connect as many as 24 different nuclear modules together to form one larger nuclear power plant. In addition to the different power ranges described in Table 2, these reactors vary greatly in size, some being only 3 to 6 feet on each side, while the NuScale reactor is 60 feet long and 14 feet in diameter. Further, many of these reactors produce significant amounts of high-temperature heat, which can be harnessed for process heating, gas turbine generators, and other operations. One major obstacle is to rapid commercialization and development are prolonged multi-year licensing times with the Nuclear Regulatory Commission. Currently, the NRC will not consider a reactor for licensing unless there is a power utility already prepared to purchase the device. Recent Senate legislation introduced by Senator Jeff Bingaman (D-NM) has pushed for DOE support in bringing down reactor costs and in helping to license and certify two reactor designs with the NRC. Some additional opportunities to facilitate the NRC licensing process for innovative small modular reactors would be to fund NRC to conduct participatory research to get ahead of potential license applications (this might require ~$100million/year) and potentially revise the current requirement that licensing fees cover nearly all NRC licensing review costs. One option for accelerating SMR development and commercialization, would be for DOD to establish SMR procurement specifications (to include cost) and agree to purchase a sufficient amount of SMR’s to underwrite private sector SMR development. Of note here may be that DARPA recently (3/30/10) issued a “Request for Information (RFI) on Deployable Reactor Technologies for Generating Power and Logistic Fuels”2 that specifies may features that would be highly desirable in an advanced commercial SMR. While other specifications including coproduction of mobility fuel are different than those of a commercial SMR power reactor, it is likely that a core reactor design meeting the DARPA inquiry specifications would be adaptable to commercial applications. While nuclear reactors purchased and used by DOD are potentially exempt from many NRC licensing requirements3, any reactor design resulting from a DOD procurement contract would need to proceed through NRC licensing before it could be commercially offered. Successful use of procured SMR’s for DOD purposes could provide the knowledge and operational experience needed to aid NRC licensing and it might be possible for the SMR contractor to begin licensing at some point in the SMR development process4. Potential purchase of small modular nuclear reactors would be a powerful but proven way in which government procurement of new energy technologies could encourage innovation. Public procurement of other renewable energy technologies could be similarly important.

#### Incentives inevitable

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Andres and Breetz 11

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

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

## adv 1

#### Adv 1 is Hawaii

#### Hawaiian bases highly vulnerable to supply disruptions and grid breakdowns---SMRs solve

Butler, 10

(Director-Operations & Training-Marine Corps Base Hawaii, “The Nuclear Option,” http://www.armedforcesjournal.com/2010/11/4847032/)

Even so, as U.S. armed forces parallel the business world with increasing investments and interest in all things green and “sustainable,” there remains a dirty word many of our military leaders have yet to utter with serious consideration: nuclear. Long the readily dismissed yet oft-misunderstood stepchild of Three Mile Island and Chernobyl, nuclear energy today is finally undergoing the beginning of a renaissance in political and entrepreneurial circles. But even as our commander-in-chief and energy secretary deliver guidance and vision for a U.S. future that includes expanded nuclear energy, our service chiefs have yet to embrace the potential watershed opportunity. This is a mistake. Our military forces should take a hard look at the promise of modern nuclear energy technology as integral parts of their long-term plans for installations’ sustainment across the homeland. To be fair, each service has a fairly new and comprehensive energy strategy. The Marine Corps has operated under the Department of the Navy’s strategy announced in October 2009, but recently stood up an Expeditionary Energy Office (E2O) and unveiled its energy strategy at a summit in August. The Air Force has a new energy strategy; the Army’s Energy Strategy for Installations and Campaign Plan was signed in 2005, but recent updates include five Strategic Energy Security Goals (ESGs) of their Energy Security and Implementation Strategy; and the Navy’s Five Strategic Energy Goals include sailing a “Great Green Fleet” of “nuclear ships, surface combatants with hybrid electric power systems using biofuel, and aircraft flying only on biofuels” by 2016. However, nuclear energy exploration is not mentioned in any of these otherwise innovative and overarching service strategies. Why? NUCLEAR GHOSTS One of the two main issues is likely a lingering fear of the old nuclear ghosts (harkening back to apprehension stirred by the movie The China Syndrome, and the TMI incident, of 1979), and an underlying collective misunderstanding about the capabilities and risks of modern nuclear technology. The second, more understandable hurdle likely stems from the question of funding and a fear of the unknown. With personnel, dollars and other resources already stretched thin, it is hard for many to envision the pursuit of sensitive, bold and perhaps radical concepts such as nuclear power on our military bases. But the focus on more widely accepted “renewable” energy sources, while a step in the right direction, does not go far enough. Not only will the services be unable to achieve their ambitious goals with these more traditional renewable energy sources, but each source is burdened with its own share of problems. The wind and sun are intermittent (the sun does not always shine; the wind does not always blow), and at best they will provide no more than 20 percent to 30 percent of our electricity, after many years. (In 2009, wind contributed only 2 percent of total generation, and solar gave us less than 0.1 percent of total U.S electrical production.) Wind farms cause conflicts with low-flying aircraft, surveillance radars and sensitive land areas, and they don’t solve the storage problem. Northern Command’s former commanding officer, Gen. Gene Renuart, recently voiced some of these concerns when he told the House Armed Services Committee that wind farms cause radar interference and can inhibit the defense of North America. They also often require significant new electrical distribution lines, a challenge daunting enough it famously convinced investor T. Boone Pickens to abandon his massive Texas wind farm plan last year. Solar power causes some similar, overlapping concerns, and also suffers from vulnerability of photovoltaic and solar technology systems. Ocean Thermal Energy Conversion raises fears of restricted fishing access and dangers to sea life, and because the technology is still fairly new, wave power can cost as much as five or six times as wind power. To be sure, most every other form of emerging, renewable energy suffers some degree of restrictions and has challenges — including potential conflict with local utility providers and unassured grid interface. Given all of these issues, the likelihood of actually achieving our ambitious energy goals without additional generation sources and technology is questionable. Beyond these limitations and the obvious “doing the right thing” aspect of traditional renewable energy, another reason — **the key reason — for the military to consider nuclear energy on our installations is to strengthen national security**. President Obama, former National Security adviser James Jones and other political and military leaders have said energy security is national security. If this is true, then our bases and stations — so largely reliant on external power sources — are at risk, and there is much work to be accomplished. The elephant in today’s energy room is the fact that many military communities rely disproportionately on foreign oil for energy**. Hawaii is a prime example, a state strategically located in the middle of the Pacific** (and where the military passed tourism last year as the No. 1 economic source), **yet a state with the highest dependence in the nation on fossil fuels — approximately 90 percent, mostly from Indonesian oil**. To achieve the kind of energy independence — and thus security — our leaders are calling for requires much more than compact fluorescent light bulbs, photovoltaic panels, biofuel plants and wind farms. Nuclear energy is a promising, yet rarely mentioned, option. Of course, the U.S. is not the only country striving for energy advancements. China, India, Brazil, Japan, South Korea, France and many other nations, including our adversaries, are ambitiously moving forward with renewable — and yes, nuclear — power production. France generates almost 80 percent of its power from nuclear energy. Some sources indicate that the nuclear energy sector is likely to grow to a trillion-dollar market by 2030. This means there will be growing international competition to provide this energy source. American entrepreneurs understand the nature of this competition, too. Bill Gates identified nuclear power as one attractive avenue while discussing energy and climate issues. He specifically mentioned new technology he was investing in — developing nuclear technology that ran on its own waste. However, recognizing the lack of apparent interest and expertise in the U.S., he acknowledged that he’s been looking to Russia, India and China for ideas. SMALL MODULAR REACTORS While fears of nuclear energy remain, some forward thinkers are pressing on and helping emerging technology to gain momentum. Small Modular Reactors (SMRs) are being developed by several companies and offer attractive energy options for military installations. These reactors are defined by the Department of Energy (DoE) as “nuclear power plants that are smaller in size [300 megawatts or less] than current generation base load plants [1,000 megawatts or higher]. These smaller, compact designs are factory-fabricated reactors that can be transported by truck or rail to a nuclear power site … ‘modular’ ... refers to a single reactor that can be grouped with other modules to form a larger nuclear power plant ... [they] require limited on-site preparation ... [and will be] ‘plug and play.’” Although acquiring SMRs might remain fiscally prohibitive for individual bases, there are ways to make this option feasible. U.S. Rep. Jim Marshall inserted text into the fiscal 2010 National Defense Authorization Act that directed the defense secretary to “conduct a study to assess the feasibility of developing nuclear power plants on military installations ... summarize options available to the Department to enter into public-private partnerships or other transactions for the construction and operation of the nuclear power plants; estimate the potential cost per kilowatt-hour and life-cycle cost savings to the Department; consider the potential energy security advantages of generating electricity on military installations through the use of nuclear power plants.” In October 2009, the president signed a provision to facilitate a study on the development of nuclear power plants for military installations. Despite a less-than-enthusiastic reception of this provision by the Pentagon, sources indicate the study is ongoing but will not be completed until later this year. Energy Secretary Steven Chu, meanwhile, has proven to be a nuclear energy champion. He has emphatically advocated SMRs, and penned a Wall Street Journal op-ed (“America’s New Nuclear Option,” March 23, 2010), which highlighted the potential significant advantages of SMR technology. Chu called SMRs “one of the most promising areas” in new energy technologies, and said “most importantly, investing in nuclear energy will position America to lead in a growing industry. ... Our choice is clear: develop these technologies today or import them tomorrow.” In the fiscal 2010 budget, no funds were allocated to the U.S. SMR program, but $38.9 million has been allocated for fiscal 2011. This is to support two primary activities: public/private partnerships to advance SMR designs, and for research and development and demonstrations. According to the DoE’s website, one of the planned program accomplishments for fiscal 2011 is to “collaborate with the Department of Defense ... to assess the feasibility of SMR designs for energy resources at DoD installations.” HOW TO PROCEED So how should the military begin exploring the advantages of SMRs on their installations? First, a multiservice nuclear energy working group should be formed, perhaps similar in spirit to the Global Nuclear Energy Partnership. This joint group should include knowledgeable and empowered individuals from each branch of the service interested in exploring nuclear energy possibilities, and would develop a plan of action and milestones for required resources and the way ahead for this endeavor. The Air Force has installations and experts dedicated to far-reaching, advanced technology such as space research, quantum physics, nuclear fission and even the holy energy grail of nuclear fusion. With places like Albuquerque’s Sandia National Laboratories, and an energy strategy vision catchphrase “make energy a consideration in all we do” as one of its centerpieces, this technologically savvy service might make a good partner with which to cross into SMR exploration. The Marines pride themselves on innovation and “out-of-the-box” approaches, and with their naval partners including many experts in the nuclear propulsion and power fields, offer not only enthusiasm but expertise and possibly even administrative acceleration, if plant certifications can be achieved through the Naval Nuclear Propulsion Program (NNPP; “Naval Reactors”) and not the Nuclear Regulatory Commission. The NRC is responsible for “licensing and regulating the operation of commercial nuclear power plants in the United States.” Military installations, however, offer unique platforms that could very possibly bypass an extended certification process. This option should be explored. With established expertise and a long safety record in nuclear reactor certification, operations, training and maintenance, “Naval Reactors” comprises the civilian and military personnel who “design, build, operate, maintain and manage the nuclear-powered ships and the many facilities that support the U.S. nuclear-powered naval fleet.” The program responsibilities are specified in Executive Order 12344 (Feb. 1, 1982) and Public Laws 98-525 (Oct. 19, 1984) and 106-65 (Oct. 5, 1999). E.O. 12344 explains that the NNPP is an “integrated program carried out by two organizational units, one in the Department of Energy (DOE) and the other in the Department of the Navy.” So, Naval Reactors should adopt an additional mission: coordinating with the Joint Nuclear Energy Working Group to research and pursue SMR technology on military installations. Finally, partnerships and Enhanced Use Leases (EULs) to support SMR deployments should be explored. As the overall expertise in SMR technology grows, additional capabilities such as expeditionary and vehicular power sources should be explored. Other technologies — including hybrid/electric vehicle power storage and recharging facilities, and water desalination plants — could possibly even co-locate with nuclear plants on installations to co-use the energy. Many external challenges do exist; compliance with the National Environmental Policy Act (NEPA) of 1969 takes time, and community support would be a critical piece of this undertaking — but neither are impediments to success if planning and execution are conducted smartly. The idea of putting nuclear power plants on military installations is by no means new, yet the time has never been better and the technology never as promising as now. The president and Chu continue to voice support for new nuclear energy initiatives, and a large, bipartisan group of political leaders stands poised to back such a plan. This inviting climate is the open door and momentum the DoD should capitalize on by aggressively pursuing what could truly be the next Apollo program. If we fail to explore this promising frontier, we are likely to lose this modern energy “space race” to the Chinese and other eager competitors. That is something the U.S. cannot afford to do. Look no further for guidance than the current National Military Strategy, released in May, in which the commander in chief declares: The United States has a window of opportunity to lead in the development of clean energy technology. If successful, the United States will lead in this new Industrial Revolution in clean energy that will be a major contributor to prosperity ... We must continue to transform our energy economy ... increase use of renewable and nuclear power. ... We will invest in research and next-generation technology. ... Our effort begins with the steps we are taking at home. We will stimulate our energy economy at home, reinvigorate the U.S. domestic nuclear industry ... and provide incentives that make clean energy the profitable kind of energy. The military, with its self-sufficient mini-communities across the country, **offers perfect beta-test platforms** and has the requisite expertise and pioneering spirit to take the nuclear energy helm. Beyond the economic value cited above by the president, putting nuclear SMRs on military installations would greatly improve our energy security — which, in turn, would strengthen our national security. After all, energy security is national security. The time for the long-anticipated nuclear renaissance is now … and the **military should enthusiastically seize the opportunity to lead the way**. AFJ

#### The plan’s key to Hawaiian SMRs

Ferguson, 10

(PhD and President, Federation of American Scientists, 5/19, Charting the Course for American Nuclear Technology: Evaluating the Department of Energy's Nuclear Energy Research and Development Roadmap, http://www.gpo.gov/fdsys/pkg/CHRG-111hhrg57172/html/CHRG-111hhrg57172.htm)

Q2. Should the Federal Government conduct a Federal demonstration program for SMR technology? What is the appropriate scale for a demonstration program to prove small modular reactor technology, reduce the technology risk, and encourage mobilization of private capital? A2. Yes, I think the time is ripe for the Federal Government to conduct a demonstration program. Utilities may be reluctant to purchase an SMR without seeing one demonstrated because the dominant paradigm is for large reactors. **One demo option is for the Defense Department to purchase an SMR**. While that would show the reactor in operation, such a plan may not satisfy the need to encourage mobilization of private capital. Another option is to demonstrate one or more SMRs in a location where the Federal Government has authority but also where the states and the commercial sectors have jurisdiction. One location that comes to mind is the Tennessee Valley Authority, which has a defense mission in its charter. The Oak Ridge National Laboratory with expertise in nuclear energy technologies may be the natural partner with TVA to demonstrate SMRs. The SMRs could provide electrical power to ORNL as well as the local communities. ORNL and the communities could share costs in paying for the electricity generated. Q3. You mention that small markets like Alaska and **Hawaii may benefit most from SMRs and that this technology would be attractive to small markets with weak grids**. But other panelists here suggest that SMRs and their ability to be ``stacked'' or used in tandem would make them a logical choice for scaled deployment of nuclear generation across the board. What is your response? A3. I think this is not an either/or choice. As indicated in my written testimony, there may be considerable merit in stacking or building sequentially several SMRs at one location as long as there are economic advantages. The International Atomic Energy Agency study that I cited in the testimony suggests that four SMRs at one location could be stacked in such a way to be very cost competitive with one large power reactor with the equivalent amount of power of the four SMRs. Concerning communities in Alaska and Hawaii, the electricity markets at those locations are relatively small and thus may not be able to handle a large power reactor or several SMRs in a stacked configuration. Nonetheless, as long as one SMR is cost competitive with alternative energy choices, then those communities may find value in purchasing an SMR. Both Alaska and Hawaii rely significantly on fossil fuels for electricity generation. So, nuclear power could serve to reduce reliance on these greenhouse gas generating sources. Concerning reliance on oil for electricity generation, **Hawaii has the highest dependency** in the United States. Consequently, alternative electricity generation sources would help alleviate this dependency. In addition to considering nuclear power in the form of SMRs, Hawaii should examine increased use of geothermal and solar sources, which are ideal in Hawaii's location. A systems analysis would be useful for Hawaii in determining what combination of geothermal, nuclear, and solar sources are environmentally sound and cost competitive with fossil fuels.

#### Otherwise the base collapses

Cooney, 11

(Columnist at Triple Pundit and Author of Building a Green Small Business, 9/28, “The U.S. Military’s Plans to Assure Energy Independence,” http://www.triplepundit.com/2011/09/whats-military-doing-assure-energy-independence/)

George Kai’iliwai, Director, Resources and Assessment, of the U.S. Pacific Command, recently spoke at the Asia Pacific Clean Energy Summit and Expo, addressing the role of the military in helping solve the world’s energy challenges. According to Ka’iliwai, **military technologies are potential game-changers in the energy world. This talk is especially relevant in Hawaii, given the state’s strategic military importance and preponderance of bases.** Military spending accounts for the number two source of money in the state, second only to tourism. According to Ka’iliwai, it was clear after a short term shutdown of the grid on Oahu in December 2008 **that the military here was completely dependent on a fragile energy infrastructure, which doesn’t bode well for how we could respond to an attack that targets our aging electricity system**. So what’s the military doing? The US Pacific Command (PaCom) includes 36 countries and islands. It includes some of the world’s largest developing nations (China and India). There is an insufficient supply of fossil fuel energy in the region, and most countries in the region are net importers of oil. There are, however, abundant renewables, with commercially viable sun and wind power resources throughout.

#### Hawaii’s key to regional power projection

Terry, 12

(U.S. Army-Pacific, “USARPAC outlines Hawaii’s importance to Army, Pacific,” 1/13, http://www.hawaiiarmyweekly.com/2012/01/13/usarpac-outlines-hawaiis-importance-to-army-pacific/)

Lt. Gen. Francis Wiercinski, commander, U.S. Army-Pacific, and other Pacific Command component commanders from each of the services based in Hawaii, presented an overview of current and projected posturing of the U.S. military in Asia and the Pacific to the Military Affairs Council, the Chamber of Commerce and other officials. Wiercinski stressed the importance of Army forces in the Pacific. “I’m here today to talk about the Army,” he said. “What is a fact is that **in a geopolitical and economic sense, the Pacific is the future**. And it is, in this century, because you are seeing a fundamental shift from Europe to the Pacific of our forces, of our priorities and where we’re headed.” He stressed the significance of Hawaii to USARPAC. “Obviously, **our center of gravity is here in Hawaii**,” he said. “It’s where the majority of our forces are; it’s where the majority of our families live; it’s where our headquarters are located. But we have forces prepositioned and stationed around the entire Pacific realm.” Solider deployments from USARPAC have played a critical role in the wars in Iraq and Afghanistan, Wiercinski said. Since 2001, USARPAC has deployed 115,000 Soldiers into those areas. The commander also praised the success of U.S. Army Garrison-Hawaii and its partnership with the local community. “Our garrison here in Hawaii is the fourth largest garrison that we have in the Army,” he said. “Just like we’ve signed a U.S. Army Covenant to our families and our Soldiers, we’ve signed a Hawaii Covenant that is also a commitment to the people here in Hawaii, the local community and the ohana that we all belong. “We have many forums that we conduct monthly, quarterly and yearly to make sure we’re staying on that path to meet our requirements and responsibilities,” he said. “Some of the things that we do (are) teaching partnership and watching out for the environment and culture that is so rich here in Hawaii.” The keynote speaker at the conference was Adm. Robert Willard, commander, PACOM. He said **Hawaii, as the forward-most state, is the most strategic in terms of entry into Asia and is an important region in the world**.

#### Key to solve Asian war

Murray, 12

(Columnist MidWeek, 6/5, “The Army’s Growing Role In The Pacific,” http://www.midweek.com/lt-gen-francis-wiercinski/)

**North Korea. China. Philippines. Indonesia. Myanmar**. Not to mention natural disasters. Lt. Gen. Francis Wiercinski, Commander U.S. Army Pacific, doesn’t have to look hard to see potential trouble spots. As the Army celebrates its 237th birthday, this proud Ranger is as focused on keeping his troops trained and ready as he is on making friends in the region **Hawaii’s importance to the U.S. Army is greater than ever**, says Lt. Gen. Francis Wiercinski Lt. Gen. Francis J. Wiercinski, the commanding general U.S. Army Pacific, seems straight out of central casting. Square-jawed, thick-chested and possessing a grip any blacksmith would admire, he exudes old school toughness. Those who work with him on a daily basis say he’s the complete opposite: humorous, passionate and someone who loves hanging out talking story. While that may be true, when you’re responsible for the health and safety of 70,000 soldiers and their families, untold billions of dollars in equipment, and half the world’s surface, not to mention being a diplomat who must deal with rogue nations, drug trafficking, terrorism, environmental threats, territorial disputes, and being called to action with little or no warning, toughness is a necessary and admirable quality. And like most in his position, nothing breaks down the stoic walls of strength faster than discussions of the young men and women who time and again go back into the fight without question or complaint. “I’ve seen acts of bravery and courage that would bring you to your knees, and these are young kids,” said Wiercinski. “It is amazing. When I jumped into Panama as a young company commander as a Ranger, nobody had been in combat for years. Today, just look at the right shoulder of every uniform out there and everyone is wearing a combat patch. It’s amazing.” The Pennsylvania native says that while military operations are winding down in Iraq and Afghanistan, very little will change for Hawaii-based troops. After a decade of missed birthdays, graduations and anniversaries and more than 140,000 deployed troops, Hawaii’s soldiers will finally be able to make long-term plans. But because the mission can change without warning and because personnel, tactics and technology are constantly changing, training will continue unabated. “We will continue to drive hard. We don’t have the luxury to wait. What we will be able to do more of is engage with our other partners in the Pacific which we’ve not had the opportunity to do very much over the last 10 or 11 years.” In a 2011 article, a Rand Corporation study put the economic impact of the military in Hawaii at $12.2 billion in 2009. It also placed Department of Defense personnel in the state at 75,473, of which 47,677 were active-duty personnel and 9,427 National Guard or reservists. While some have argued over the necessity of having so many military personnel in such a small area, Wiercinski says Hawaii’s location **makes it of critical importance** to keep an eye on the bad guys while helping friends and building relationships. “This is a 9,000-miles-across AOR (area of responsibility). If something happens, you are not going to get there (in time from a Mainland base), it’s just physically impossible. If you’re not engaged, if you’re not working together, if you don’t understand the culture, if you’re not building relationships its very easy for someone to tell you no. It is easy for someone to make friends somewhere else. We have to settle conflicts long before they get to a level before you can’t turn them around anymore. Bullets downrange, that is expensive. Blood, life, equipment. You don’t want to get into phase three, let’s keep it in phase zero. Are there threats? Yep, a lot of them. They range from pandemics, to transnational terroristic threats to nuclear threats like in North Korea. But we are talking.” The general points to Operation Tomodachi, the combined effort between the U.S. and Japan to provide relief following last year’s earthquake and tsunami as another example of the importance of location and familiarity.

#### Goes nuclear

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

Asian *investment* is also at record levels. Asian countries lead the world with unprecedented infra­structure projects. With over $3 trillion in foreign currency reserves, Asian nations and businesses are starting to shape global economic activity. Indian firms are purchasing industrial giants such as Arcelor Steel, as well as iconic brands of its once-colonial ruler, such as Jaguar and Range Rover. China’s Lenovo bought IBM’s personal computer

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

## adv 2

#### Adv 2 is hydrogen

#### SMR development causes military hydrogen

Alt Energy Today, 10/25

(“Alternative Energy The Ways that the Military is Using,” http://www.alternative-energy-today.com/the-ways-that-the-military-is-using-alternative-energy/)

One thing that the military leaders stress is the desire for the forces deployed in the theater to be able to be more alternative energy-independent. Currently the US military has policies and procedures in place to interact with allies or sympathetic local populaces to help its forces in the field get their needed energy and clean water when engaged in a foreign military campaign. However, this is not wholly reliable, as the US might well find itself facing unilateral military activities, or have itself in a situation where its allies cannot help it with the resources it needs to conduct its military actions successfully. The US military is very interested in certain alternative energy that, with the right research and development technologically, can make it energy independent, or at least a great deal more so, on the battlefield. One of the things that greatly interests the military along these lines is **the development of small nuclear reactors,** which could be portable, for producing theater-local electricity. The military is impressed with how clean-burning nuclear reactors are and how energy efficient they are. Making them portable for the typical warfare of today’s highly mobile, small-scaled military operations is something they are researching. The most prominent thing that the US military thinks these small nuclear reactors **would be useful for** involves **the removal of hydrogen (for fuel cell) from seawater.** It also thinks that converting seawater to hydrogen fuel in this way would have less negative impact on the environment than its current practices of remaining supplied out in the field. **Seawater is, in fact, the military’s highest interest when it comes to the matter of alternative energy supply. Seawater can be endlessly “mined” for hydrogen, which in turn powers advanced fuel cells.** Using OTEC, seawater can also be endlessly converted into desalinated, potable water. Potable water and hydrogen for power are two of the things that a near-future deployed military force will need most of all. In the cores of nuclear reactors—which as stated above are devices highly interesting, in portable form, to the US military—we encounter temperatures greater than 1000 degrees Celsius. When this level of temperature is mixed with a thermo-chemical water-splitting procedure, we have on our hands the most efficient means of breaking down water into its component parts, which are molecular hydrogen and oxygen. The minerals and salts that are contained in seawater would have to be extracted via a desalination process in order to make the way clear for the water-splitting process. These could then be utilized, such as in vitamins or in salt shakers, or simply sent back to the ocean (recycling). **Using the power of nuclear reactors to extract this hydrogen from the sea, in order to then input that into fuel cells to power advanced airplanes, tanks, ground vehicles**, and the like, is clearly high on the R & D priority list of the military.

#### Tech is viable—just need hydrogen fuel

Chuck Squatriglia, Wired, 4/22/11, Discovery Could Make Fuel Cells Much Cheaper, www.wired.com/autopia/2011/04/discovery-makes-fuel-cells-orders-of-magnitude-cheaper/

One of the biggest issues with hydrogen fuel cells, aside from the lack of fueling infrastructure, is the high cost of the technology. Fuel cells use a lot of platinum, which is frightfully expensive and one reason we’ll pay $50,000 or so for the hydrogen cars automakers say we’ll see in 2015. That might soon change. Researchers at Los Alamos National Laboratory have developed a platinum-free catalyst in the cathode of a hydrogen fuel cell that uses carbon, iron and cobalt. That could make the catalysts “two to three orders of magnitude cheaper,” the lab says, thereby significantly reducing the cost of fuel cells. Although the discovery means we could see hydrogen fuel cells in a wide variety of applications, it could have the biggest implications for automobiles. Despite the auto industry’s focus on hybrids, plug-in hybrids and battery-electric vehicles — driven in part by the Obama administration’s love of cars with cords — several automakers remain convinced hydrogen fuel cells are the best alternative to internal combustion. Hydrogen offers the benefits of battery-electric vehicles — namely zero tailpipe emissions — without the drawbacks of short range and long recharge times. Hydrogen fuel cell vehicles are electric vehicles; they use a fuel cell instead of a battery to provide juice. You can fill a car with hydrogen in minutes, it’ll go about 250 miles or so and the technology is easily adapted to everything from forklifts to automobiles to buses. Toyota, Mercedes-Benz and Honda are among the automakers promising to deliver hydrogen fuel cell vehicles in 2015. Toyota has said it has cut the cost of fuel cell vehicles more than 90 percent by using less platinum — which currently goes for around $1,800 an ounce — and other expensive materials. It plans to sell its first hydrogen vehicle for around $50,000, a figure Daimler has cited as a viable price for the Mercedes-Benz F-Cell (pictured above in Australia). Fifty grand is a lot of money, especially something like the F-Cell — which is based on the B-Class compact — or the Honda FCX Clarity. Zelenay and Wu in the lab. In a paper published Friday in Science, Los Alamos researchers Gang Wu, Christina Johnston and Piotr Zelenay, joined by Karren More of Oak Ridge National Laboratory, outline their platinum-free cathode catalyst. The catalysts use carbon, iron and cobalt. The researchers say the fuel cell provided high power with reasonable efficiency and promising durability. It provided currents comparable to conventional fuel cells, and showed favorable durability when cycled on and off — a condition that quickly damages inferior catalysts. The researchers say the carbon-iron-cobalt catalyst completed the conversion of hydrogen and oxygen into water, rather than producing large amounts of hydrogen peroxide. They claim the catalyst created minimal amounts of hydrogen peroxide — a substance that cuts power output and can damage the fuel cell — even when compared to the best platinum-based fuel cells. In fact, the fuel cell works so well the researchers have filed a patent for it. The researchers did not directly quantify the cost savings their cathode catalyst offers, which would be difficult because platinum surely would become more expensive if fuel cells became more prevalent. But the lab notes that iron and cobalt are cheap and abundant, and so the cost of fuel cell catalysts is “definitely two to three orders of magnitude cheaper.” “The encouraging point is that we have found a catalyst with a good durability and life cycle relative to platinum-based catalysts,” Zelenay said in a statement. “For all intents and purposes, this is a zero-cost catalyst in comparison to platinum, so it directly addresses one of the main barriers to hydrogen fuel cells.”

#### Key to UAV effectiveness

NRL, Naval Research Laboratory, Fall 2010, Fuel Cell Power Soar on Fuel Cell Power, http://www.nrl.navy.mil/content\_images/SPECTRA\_Fall2010.pdf

Piloted remotely or autonomously, unmanned aerial vehicles have long provided extra “eyes in the sky,” especially for missions that are too dangerous for manned aircraft. At the Naval Research Laboratory (NRL), scientists are merging UAV technology and alternative energy research to develop advanced, fuel-cell-powered UAVs that can fly longer, lower, quieter, and farther than their traditionally powered counterparts, offering significant tactical advantages.

Building on its extensive experience developing battery-powered electric UAVs, NRL began research into fuel cell UAVs in 2003. Starting with a small, 100-watt fuel cell from Protonex Technology Corporation, an NRL team assembled a power system from off-the-shelf parts such as tubing and aluminum foil to make the radiator, and a tank from a paintball gun to hold high-pressure hydrogen for

fuel. They retrofitted the system into a sailplane kit and called the vehicle the “Spider Lion.” In its November 2005 demonstration flight, the 6-pound Spider Lion flew for 3.3 hours with only a half-ounce of hydrogen in its tank. Although the Spider Lion was far from a useful military vehicle — it had no payload and was not very durable — it showed that fuel-cell-powered flight was possible for UAVs.

Why Fuel Cells?

Fuel cells offer clean, quiet, high-efficiency electric power for UAVs. Proton exchange membrane (PEM) fuel cells, also called polymer fuel cells, are electrochemical devices that create an electric current when they combine hydrogen and oxygen to make water. They consume only hydrogen and air, and their only emissions are water and heat.

Fuel cells are two to three times more efficient than internal combustion engines, and have much greater endurance than batteries. While batteries provide quiet and reliable electrical energy, and are used to power many of he small UAVs on the battlefield today, their low endurance translates into less time collecting intelligence and more time spent on “refueling” and turnaround. Fuel cell systems overcome these limitations.

The Navy is interested in harnessing fuel cell technology to increase power potential and energy efficiency across its operational spectrum — from air vehicles to ground vehicles to undersea vehicles; to man-portable power generation for Marine expeditionary missions; to meeting power needs afloat.

The Office of Naval Research (ONR), a major sponsor of NRL’s fuel cell research, has been supporting the development of innovative power and energy technologies for decades. “Pursuing energy efficiency and energy independence are core to ONR’s Power and Energy Focus Area,” said Rear Admiral Nevin Carr, Chief of Naval Research. “ONR’s investments in alternative energy sources, like fuel cell research, have application to the Navy and Marine Corps mission in future UAVs and vehicles. These investments also contribute directly to solving some of the same technology challenges faced at the national level.”

Lightweight, Durable, and Stealthy: XFC In 2006, through sponsorship of ONR and the Office of the Secretary of Defense’s Rapid Reaction Technology Office and Office of Technology Transition, NRL partnered with Protonex Technology Corporation to design and build a hydrogen fuel cell power plant for a battlefield-capable, payload-carrying UAV. They aimed to put the most power they could into the smallest and lightest package possible. The team first tested a new 2.2-pound, 300-watt fuel cell system onboard the eXperimental Fuel Cell unmanned aerial system, or XFC UAS. NRL’s Chemistry and Tactical Electronic Warfare divisions developed the XFC UAS as an affordably expendable surveillance platform. It is a folding-wing UAV that ejects from an 18” diameter transport tube and unfolds to its X-shaped flight configuration after launch. XFC is fully autonomous and weighs 19 pounds with a 2.5-pound payload. The hydro a vehicle called the Ion Tiger. For the Ion Tiger UAV, the mission goal was to fly for 24 hours and carry a 5-pound payload — the approximate weight of common payloads such as a day/night camera or a communication relay. NRL again teamed with Protonex Technology Corporation to improve the fuel cell system, along with the University of Hawaii for systems testing and modeling, HyperComp Engineering to build the hydrogen tanks, and Arcturus UAV to build the airframe. The team designed a 37-pound vehicle with a 17-foot wingspan, allowing 13 pounds (0.75 horsepower) fuel cell system still weighed only 2.2 pounds, but now was more efficient, converting 99 percent of the hydrogen fuel to electricity at 40 to 55 percent efficiency. NRL developed thermal and systems models and new methods to make custom hydrogen fuel tanks, making the entire fuel cell system design modular so it can be adapted to a variety of military and commercial platforms. In October 2009, at the U.S. Army’s Aberdeen Proving Ground on the northwestern shore of Maryland’s Chesapeake Bay, the Ion Tiger was launched for its much-anticipated test flight. The UAV stayed aloft for23 hours and 17 minutes to set an unofficial endurance record for fuelcell-powered flight, despite stormy and windy weather conditions. The Ion Tiger was flown again in November 2009 for an unprecedented 26 hours and 1 minute, beating its previous record and exceeding program goals. Through these demonstrations, NRL proved that polymer fuel cell technology can meet or surpass the performance of traditional power systems. In fact, the Ion Tiger fuel cell system provided seven times the endurance of the equivalent weight in batteries. “This is something that, until now, has not been achieved by anyone,” said ONR Program Manager Dr. Michele Anderson. “The Ion Tiger successfully demonstrates ONR’s vision to show how efficient, clean technology can be used to improve the warfighter’s capabilities.” NRL has come a long way since that first Spider Lion flight. “Today,” says NRL’s principal investigator for alternative energy research, Dr. Karen Swider-Lyons, “these long-endurance flights are made possible by the team’s sustained research on high-power fuel cell systems, lightweight hydrogen-gas storage tanks, improved thermal management, and the effective integration of these systems.”

The Sky’s the Limit

NRL scientists and engineers are already working on the next generation of fuel cell UAVs. They are focusing on tripling the flight endurance of the present power system by using cryogenic liquid hydrogen, which can be stored at about a third the weight of the compressed hydrogen gas. They are also exploring a larger system with a 1.5-kilowatt (2-horsepower) fuel cell capable of carrying a 15to 30-pound payload.

Military planners want these stealthy, more capable, fuel-cell-powered UAVs. These aircraft will be able to stay on station for long periods of time, supplying commanders with continuous surveillance. Their long endurance will enable them to serve as communication relays. Their quiet propulsion will allow them to fly undetected at low altitudes, and thus perform high-quality surveillance with low-resolution imaging systems. The hydrogen fuel can be electrolyzed directly from seawater onboard Navy ships, so these UAVs could reduce some of the logistics burdens associated with traditional fuels.

The ultimate benefit will be to replace large, manned aircraft with smaller, less expensive fuel cell UAVs — keeping more personnel out of harm’s way and improving tactical capabilities, all by using a “green,” quiet, efficient, and affordable fuel system.

#### UAVs key to force projection, application, and battlefield awareness—fuel cells key

-nuclear forensics

-mine neutralization / clearance

-forward operating base security

-recon

Gross et al 11

Thomas Gross, Albert Poche, Kevin Ennis, DOD Defense Logistics Agency Research & Development, 10/19/2011, Beyond Demonstration: The Role of Fuel Cells in DoD's Energy Strategy, http://www.chfcc.org/publications/reports/dod-fuel-cell\_10-19-11\_dlafuelcells.pdf

Future uses for unmanned vehicles may extend well beyond their current missions. The Integrated Roadmap maps projected unmanned systems against JCAs to determine how unmanned systems can contribute to DoD missions in the future. Its conclusions indicate that future unmanned systems could be key contributors to:

Battlefield awareness. Unmanned systems in all domains can significantly contribute to future battlefield awareness. Missions will include expeditionary runway evaluation, nuclear forensics, and special forces beach reconnaissance. Future applications will require longer mission endurance to conduct persistent reconnaissance and surveillance.

Force application. Unmanned systems are projected to have a large presence in this JCA. Future missions for UAVs include air-to-air combat and suppression and defeat of enemy air defense. UGVs are expected to conduct missions such as non-lethal and lethal crowd control, dismounted offensive operations, and armed reconnaissance and assault operations. UUV and unmanned surface vehicle missions are projected to include mine laying as well as mine neutralization.

Protection. Unmanned systems are projected to perform tasks such as firefighting, decontamination, forward operating base security, installation security, obstacle construction and breaching, vehicle and personnel search and inspection, mine clearance and neutralization, more sophisticated explosive ordnance disposal, casualty extraction and evacuation, and maritime interdiction.

Logistics. Unmanned systems are expected to transport supplies and perform maintenance tasks such as inspection, decontamination, and refueling. Future safety-related tasks will include munitions and material handling and combat engineering.

Force support. The capabilities of unmanned systems may allow them to have a significant impact on medical sup port. They also could contribute to nuclear and bio-weapon forensics and contaminated remains recovery.

In March 2011, ONR issued a BAA seeking proposals on longendurance unmanned undersea vehicle propulsion. The BAA states, “Greater breadth of mission profiles for current and future Naval UUVs require longer endurance stealthy propulsion systems that extend the current capability of 10–40 hours to several days or weeks.”

VALUE PROPOSITION FOR DoD BENEFITS

For the unmanned vehicle application, mission accomplishment is generally the highest priority consideration in making vehicle design and systems decisions. Compared to other power options, fuel cells can provide improved mission capability.

Increased mission endurance. Fuel cell systems can increase flight duration for UAVs; time on station for UAVs and UUVs; and range for all unmanned vehicles (“DoD Fuel Cell Activities” and “Other Fuel Cell Activities,” above.) Current power sources limit the ability of unmanned vehicles to support long-duration missions.

Reduced noise and heat signatures. The sound and heat that conventional power systems produce sometimes limit how well unmanned vehicles can accomplish their missions. Fuel cells can be an attractive option for vehicles where sound or operating temperature are considerations.

Increased efficiency. Fuel cells are significantly more energy efficient than internal combustion engines, which improves mission duration.[70]

#### Key to ISR—solves crisis management

John L. Trefz, Jr., LCDR, US Navy, 2003, From Persistent ISR to Precision Strikes: The Expanding Role of UAVs, http://www.dtic.mil/dtic/tr/fulltext/u2/a420264.pdf

“Operational intelligence is directed at collection, analysis, and evaluation of information dealing with all aspects of the situation in a given theater of operation plus adjacent areas of interest.”21 The ability to gather timely, relevant intelligence is critical to the success of any major operation or campaign. The capability to provide adequate coverage of the operational commander’s Area of Responsibility (AOR) or Area of Interest (AOI) depends on the integration of both manned and unmanned assets. The level of effort will vary with the size (factor space) of the AOR/AOI and the time available (factor time) for intelligence collection.

During the pre-hostility stage of a conflict, UAVs can assist manned assets in the Intelligence Preparation of the Theater (IPT). Easily transportable and rapidly deployable, both the Global Hawk and Predator systems can quickly respond to an emerging crisis. Their smaller “footprint” in a given theater allows the operational commander to gather intelligence with less diplomatic and political interference. The deployment of manned platforms such as the JSTARS or Rivet Joint aircraft to monitor a given crisis results in a very large support package to sustain operations. Once these aircraft are in theater, Operational Security (OPSEC) becomes more challenging and Military Deception (MILDEC) may be lost.

During the monitoring of adversary activity, the presence of easily identifiable, radar significant intelligence platforms makes easier the enemy’s job of hiding his activities. UAVs’ smaller size, combined with long endurance and unlimited sustainability, makes them the optimal platform during the pre-hostility phase of operations.

Once hostilities commence, the UAV remains the premier intelligence-gathering platform. The reduced risk to coalition aircraft and personnel in high-threat environments makes UAV employment ideal. Although systems such as the Global Hawk at $10 million per unit are not considered expendable, the cost of losing one of these assets is insignificant when compared to the loss of a manned asset and its aircrew. The ability of UAVs to provide real-time BDA to the operational commander will allow more efficient allocation of follow-on strike assets to maximize their effects on the enemy’s ability to continue to resist.

Command and Control Warfare (C2W)

Information Warfare (IW) is the “actions aimed at achieving information superiority by denying, exploiting, corrupting, or destroying the enemy’s information and information functions while protecting one’s own from enemy attack.”23 C2W uses OPSEC, MILDEC, PSYOPS, Electronic Warfare (EW) and Physical Destruction to defeat the enemy’s Command and Control (C2) functions while protecting one’s own.24 The UAV has the ability to accomplish all of these functions effectively.

As mentioned before, the employment of UAVs for monitoring and IPT missions improves both OPSEC and MILDEC activities. Additionally, the psychological impact to the enemy of constant monitoring and surveillance cannot be overlooked. The ability of the UAV to maintain 24/7 coverage of selected portions of the AOR will make it virtually impossible for the enemy to determine if or when he is being watched. The “CNN Factor” of constant coverage will make him think that all his movements are under scrutiny. When you add a limited strike capability to the UAV, such as armed Predators, the adversary commander would have to assume that all UAVs are armed.

Another subset of C2W is Electronic Warfare (EW). This is an area where the UAV can tackle the “dull” and the “dangerous” missions presently performed by manned aircraft. The three parts of EW are Electronic Attack (EA), Electronic Protect (EP), and Electronic Support (ES).25 EA serves to deny the enemy’s operational commander the use of the electromagnetic spectrum while EP serves to safeguard the use of the same spectrum for our operational commander. ES involves those activities which serve to identify our enemy’s activities and help locate the threats (SIGINT is a by-product). ES also helps to provide Indications and Warnings (I&W) to our forces of immediate threats or potential future threats enhancing overall Force Protection. The Global Hawk UAV is ideally suited for the mission of monitoring enemy electronic emissions and providing timely threat warnings to the operational commander. As UAV technology advances, they will prepare the battlefield by leading the way into high threat envelopes and neutralizing enemy air defense systems. As mentioned before, they are not expendable, but their loss would be more acceptable than that of a manned aircraft.

#### Key to de-escalate crises—the alternative is deterrence collapse and wars

Vincent Alcazar, Colonel, USAF, Winter 2012, Crisis Management and the Anti-Access/Area Denial Problem, http://www.au.af.mil/au/ssq/2012/winter/alcazar.pdf

America’s political and military leaders rely on unimpeded US force movements across strategic distances to stabilize regions and deter threatening regimes. That reliance depends on assured air and naval superiority as a precondition. US leaders assume that with air and naval superiority during wartime, the United States can secure its interests and attain its objectives through robust military intelligence, logistics, maneuver, and firepower. But the rise of anti-access (A2) and area denial (AD) strategies and capabilities poses a problem for US foreign policy: A2/AD thwarts US ability to project power and force on its own terms. By using an A2/ AD strategy, regional adversaries are able to contest US power projection and presence. This strategy and capability allows adversaries to oppose the United States across its operational and strategic depth.

When Pres. Barack Obama and Secretary of Defense Leon Panetta unveiled the new DoD strategic guidance, Sustaining US Global Leadership: Priorities For The 21st Century Defense, on 3 January 2012, Secretary Panetta wrote in his introduction, “this country is at a strategic turning point after a decade of war and, therefore, we are shaping a Joint Force for the future that will be smaller and leaner, but will be agile, flexible, ready, and technologically advanced.”1 Additionally, “it [joint force] will have cutting edge capabilities, exploiting our technological, joint, and networked advantage.” The document referenced the challenges to US power projection by A2/AD and identified competitors to US power projection. Specifically, China and Iran were cited as “[pursuing] asymmetric means to counter our power projection capabilities, while the proliferation of sophisticated weapons and technology will extend to nonstate actors as well.”2 The A2/AD verbiage in the document indicates what must be done: the United States must have assured methods of projecting military force where presence of that force will be contested.3 The DoD strategic guidance document also discussed the recently completed Joint Operational Access Concept (JOAC).4 While the JOAC addresses how US forces must be able to enter highly contested places, it is not a conceptual design that promotes strategic theories for shaping and deterring A2/AD adversaries.5

Without a better understanding of the A2/AD problem and new ideas to assure its power and force projection, the United States will gradually lose its ability to shape regions and deter A2/AD adversaries. The A2/ AD challenge demands an offsetting strategy, a retooling of US power and force projection concepts, and an examination of the ways US power projection can shape A2/AD crisis management. This article presents the concept of A2/AD, including the nature of the problem, and amplifies the A2/AD strategy. It then offers a new crisis management design framework, followed by planning considerations for the future of A2/AD.

The terms in figure 1 make the case for an applied design concept to better manage crises in A2/AD settings. They imply the notion of the “A2/AD portfolio”—an adversary’s all-of-their-government method of undermining regional stabilization that also blunts US projection of power and force. The US “offsetting strategy” refers to a multilinear whole-of-government method geared to overcome the resistance and effects of a rival’s A2/AD strategy.

The primary benefit of this design concept for crisis management is to ensure the United States can continue to use assured military presence and whole-of-government synchronized effort to strengthen its influence in key regions. Other benefits include improved understanding and specified design that allow the United States to better shape a crisis with an A2/AD adversary; or alternatively, better position its entry into conflict against an A2/AD threat. There are three premises which underlie this concept for crisis management: (1) the nature of war does not change, but the character of war does change from era to era,6 (2) the United States will need fresh theories and concepts of shaping, deterring, and war fighting less tethered to its traditions of annihilation warfare, and (3) A2/AD will multiply US force attrition, erode its conventional deterrence, and undercut its ability to manage escalation and deescalation.

#### 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.

#### UAVs key to nuclear forensics

The Royal Society, 2008, Detecting nuclear and radiological materials, http://www.offiziere.ch/wp-content/uploads/Detecting-nuclear-and-radiological-materials.pdf

Airborne radiation surveys have a well developed history of use with applications ranging from mineral exploration and geological mapping, to fallout mapping, nuclear site characterisation and source searches under diverse conditions. They have a key role to play in emergency response to map areas after contamination, and UAV platforms are particularly suited to this application. The Israeli Caspar UAV prototype can fly at a height of up 700 m at speeds of 20-85 km/h for up to 1.5 hours, and its field of view is over 10 km. The Caspar includes an off-the-shelf, combined gamma and neutron CsI(TI) (caesium iodide doped with thalium iodide) radiation detector, in addition to a camera and a global positioning system (GPS). It can fly at low altitude and transmit both its detection data and position in real time to a ground based team. Advantages of UAV systems are that they are light weight and can be deployed rapidly from any site. They are also considerably less costly to operate than aircraft and helicopter based systems. Being unpiloted and remote-controlled, they minimise radiation exposure to personnel and can even be disposed of afterwards if contaminated. These features make UAVs ideal for fast scanning and mapping of large contaminated areas, and monitoring and sampling radioactive plumes. 5.3 Urban surveys Aerial detection has an important role to play in urban surveys and the manoeuvrability of rotary-wing systems means that they are particularly suited to this role. Helicopter based systems allow survey flights to be performed at low altitude of 50 m in open space and 100 m in urban areas, and at low speeds of approximately 70 km/h to ensure uniform coverage and to provide high detection sensitivities. A typical helicopter based system might incorporate at least one germanium detector, as well as NaI detectors, a radioThe Royal Society Detecting nuclear and radiological materials | March 2008 | 13 RS policy document 07/08 altimeter, and a GPS. These detectors need to be light, compact, and modular so that they can be easily attached to the helicopter. Urban surveys present particular difficulties due to the high levels of background NORM in cities. In the built urban environment, there are many point source signals and so aerial detection can trace a source to a general area but not to a particular building. A two-tiered detection approach is a potential solution to this problem, using aerial detection to identify hotspots followed by vehicle based and other mobile systems to isolate the location of sources for further investigation. 5.4 Vehicle and mobile systems The smaller fields of view of vehicle based and other mobile systems allow for a greater level of detail in detection operations to complement wide-range airborne systems. Vehicle based systems, as well as novel mobile platforms, such as suitcase and backpack systems, are more useful for variable terrain in cities and urban areas. However, deployment of these mobile systems is more labour intensive and time consuming. 5.5 Novel applications Airborne detection systems are valuable in protective and responsive roles when used in combination with other approaches, especially as part of a layered detection network. They can be particularly suited to protecting focal points, such as high-value facilities or key buildings. Intelligence plays an essential part in assisting searches for materials and devices, including updates once items have gone missing. Safeguards programmes may also provide useful forewarning. Tethered balloons and masts could provide elevated continuous detection over focal points. These may include important buildings, ports of entry and places where crowds gather for events. Airships could also provide a useful platform for urban surveys. Participants felt that there was a minimal role for adapting instrumentation to detect ionising radiation emitted from SNM using space based platforms. The only area that might merit further consideration could be the detection of Cerenkov radiation or fluorescence generated in the vicinity of sources that are able to penetrate the atmosphere. Remote satellite imaging may however have a potential role in monitoring declared nuclear materials and facilities, and identifying supply networks. 5.6 Future research and development priorities Baseline surveys of nuclear sites can show features related to fission products, activation products, fuel cycle products, machine sources, including shielded or collimated signals, under conditions which simulate urban areas. However, there is a need for greater attention to urban surveys where further operational studies and response modelling is needed. A regular programme of baseline mapping is essential to provide the location of fixed radiation sources before an incident or emergency. For example ongoing background radiation surveys are taken of nuclear sites in France. Some participants felt that the results of aerial surveys could be published for method validation, as well as educating and encouraging greater public understanding of the radiological environment of normal life. Baseline mapping therefore has an important role to play in enhancing resilience. The performance of aerial detection systems in source searches during international excerises has often been much lower than the theoretical performance capacities of sytems tested. Simulation and training exercises are key to using systems to their fullest. These can also provide important opportunities to enhance data exchange and to improve inter-operability under time constrained conditions. More systematic work is needed to improve response models and survey interpretation methods, particularly with regard to urban areas and radiation transport visualisation. Further modelling of operational scenarios may be helpful since search capacities that can cater for many scenarios are needed. Ideally such scenario modelling would be carried out at the international level. 6 Nuclear forensics Nuclear forensics is a multidisciplinary field, drawing on analytical methods adapted from safeguards, materials science, and isotope geology to investigate nuclear or radiological material for its isotopic and elemental composition, geometry, impurities, macroscopic appearance and microstructure. This information can be used to establish the material’s age, intended use, and method of production. Establishing the material’s age, surface roughness and identifying the reactor in which it was used are key signatures needed to determine: when the material was last chemically processed; if it was formed as fuel in a nuclear power reactor; and what type of reactor it was burnt in. If all this information can be compared with external reference data, then it is possible to determine where the material was produced. From that information, it may be possible to deduce its last legal owner, and the smuggling route. Nuclear forensics plays a central role in linking the prevention, detection, and response components of the nuclear security architecture, and ensuring its sustainability. This field has different research and development requirements to detection technologies that need to be supported. Reliable attribution leading to prosecution presents a strong preventative deterrent to potential smugglers. It also highlights vulnerabilities in the safeguards and physical security measures at the place of theft or diversion, which could then be strengthened to prevent future incidents. The Nuclear Smuggling International Technical Working Group (ITWG) is a multi-agency, interdisciplinary group, which advances the science of nuclear forensics as an integral part of the incident response process.

#### Attribution deters state-sponsored nuclear terror—key to Iran

Talmadge 7

(IR & Government Prof-George Washington, PhD-MIT, “Deterring a Nuclear 9/11, Spring, www.twq.com/07spring/docs/07spring\_talmadge.pdf)

Deterring a Nuclear 9/11

If the United States develops a credible nuclear attribution capability, states that wish to protect their citizens, territory, and interests are more likely to re­frain from providing assistance to terrorists in the first place. Some might even find that they have a newly discovered interest in securing their nuclear mate­rials, weapons, or expertise. It is difficult to imagine that the Pakistani govern­ment would turn a blind eye to a future A. Q. Khan if it believed that nuclear material or technology could be traced definitively back to Pakistan and that its people and infrastructure would suffer the consequences if those items were used in an attack against the United States. A similar logic might caution Iran against transferring such items to Hizballah, a long-standing recipient of con­ventional Iranian military technology and armaments, or warn North Korea against selling parts of its emerging nuclear arsenal to the highest bidder.

#### Nuclear terrorism likely—state sponsorship key

Graham Allison, Director, Belfer Center for Science and International Affairs; Douglas Dillon Professor of Government; Faculty Chair, Dubai Initiative, Harvard Kennedy School, 9/7/12, "Living in the Era of Megaterror", belfercenter.ksg.harvard.edu/publication/22302/living\_in\_the\_era\_of\_megaterror.html

Today, how many people can a small group of terrorists kill in a single blow? Had Bruce Ivins, the U.S. government microbiologist responsible for the 2001 anthrax attacks, distributed his deadly agent with sprayers he could have purchased off the shelf, tens of thousands of Americans would have died. Had the 2001 “Dragonfire” report that Al Qaeda had a small nuclear weapon (from the former Soviet arsenal) in New York City proved correct, and not a false alarm, detonation of that bomb in Times Square could have incinerated a half million Americans.

In this electoral season, President Obama is claiming credit, rightly, for actions he and U.S. Special Forces took in killing Osama bin Laden. Similarly, at last week’s Republican convention in Tampa, Jeb Bush praised his brother for making the United States safer after 9/11. There can be no doubt that the thousands of actions taken at federal, state and local levels have made people safer from terrorist attacks.

Many are therefore attracted to the chorus of officials and experts claiming that the “strategic defeat” of Al Qaeda means the end of this chapter of history. But we should remember a deeper and more profound truth. While applauding actions that have made us safer from future terrorist attacks, we must recognize that they have not reversed an inescapable reality: The relentless advance of science and technology is making it possible for smaller and smaller groups to kill larger and larger numbers of people.

If a Qaeda affiliate, or some terrorist group in Pakistan whose name readers have never heard, acquires highly enriched uranium or plutonium made by a state, they can construct an elementary nuclear bomb capable of killing hundreds of thousands of people. At biotech labs across the United States and around the world, research scientists making medicines that advance human well-being are also capable of making pathogens, like anthrax, that can produce massive casualties.

What to do? Sherlock Holmes examined crime scenes using a method he called M.M.O.: motive, means and opportunity. In a society where citizens gather in unprotected movie theaters, churches, shopping centers and stadiums, opportunities for attack abound. Free societies are inherently “target rich.”

Motive to commit such atrocities poses a more difficult challenge. In all societies, a percentage of the population will be homicidal. No one can examine the mounting number of cases of mass murder in schools, movie theaters and elsewhere without worrying about a society’s mental health. Additionally, actions we take abroad unquestionably impact others’ motivation to attack us.

As Faisal Shahzad, the 2010 would-be “Times Square bomber,” testified at his trial: “Until the hour the U.S. ... stops the occupation of Muslim lands, and stops killing the Muslims ... we will be attacking U.S., and I plead guilty to that.”

Fortunately, it is more difficult for a terrorist to acquire the “means” to cause mass casualties. Producing highly enriched uranium or plutonium requires expensive industrial-scale investments that only states will make. If all fissile material can be secured to a gold standard beyond the reach of thieves or terrorists, aspirations to become the world’s first nuclear terrorist can be thwarted.

#### Nuclear war

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

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

#### Iranian sponsorship causes Middle East nuclear war

Stanley Kurtz, National Review, 8/28/2006, Our Fallout-Shelter Future, www.nationalreview.com/articles/218561/our-fallout-shelter-future/stanley-kurtz#

We’re familiar with the horror scenario of a Muslim state passing a nuclear bomb to terrorists for use against an American city. But imagine the same scenario in a multi-polar Muslim nuclear world. With several Muslim countries in possession of the bomb, it would be extremely difficult to trace the state source of a nuclear terror strike. In fact, this very difficulty would encourage states (or ill-controlled elements within nuclear states — like Pakistan’s intelligence services or Iran’s Revolutionary Guards) to pass nukes to terrorists. The tougher it is to trace the source of a weapon, the easier it is to give the weapon away. In short, nuclear proliferation to multiple Muslim states greatly increases the chances of a nuclear terror strike. Right now, the Indians and Pakistanis “enjoy” an apparently stable nuclear stand-off. Both countries have established basic deterrence, channels of communication, and have also eschewed a potentially destabilizing nuclear arms race. Attacks by Kashmiri militants in 2001 may have pushed India and Pakistan close to the nuclear brink. Yet since then, precisely because of the danger, the two countries seem to have established a clear, deterrence-based understanding. The 2001 crisis gives fuel to proliferation pessimists, while the current stability encourages proliferation optimists. Rosen points out, however, that a multi-polar nuclear Middle East is unlikely to follow the South Asian model. Deep mutual suspicion between an expansionist, apocalyptic, Shiite Iran, secular Turkey, and the Sunni Saudis and Egyptians (not to mention Israel) is likely to fuel a dangerous multi-pronged nuclear arms race. Larger arsenals mean more chance of a weapon being slipped to terrorists. The collapse of the world’s non-proliferation regime also raises the chances that nuclearization will spread to Asian powers like Taiwan and Japan. And of course, possession of nuclear weapons is likely to embolden Iran, especially in the transitional period before the Saudis develop weapons of their own. Like Saddam, Iran may be tempted to take control of Kuwait’s oil wealth, on the assumption that the United States will not dare risk a nuclear confrontation by escalating the conflict. If the proliferation optimists are right, then once the Saudis get nukes, Iran would be far less likely to make a move on nearby Kuwait. On the other hand, to the extent that we do see conventional war in a nuclearized Middle East, the losers will be sorely tempted to cancel out their defeat with a nuclear strike. There may have been nuclear peace during the Cold War, but there were also many “hot” proxy wars. If conventional wars break out in a nuclearized Middle East, it may be very difficult to stop them from escalating into nuclear confrontations. Duck! What would life be like in such a world? Rosen argues that we must lose no time in constructing a specialized radar and satellite warning network trained on the Middle East. Without knowing who’s sending missiles against us, we cannot strike back or deter. Rosen also argues that even a somewhat leaky anti-missile defense system is going to be a must. A star-wars-type missile-defense system may have seemed powerless against the massive might of the old Soviet nuclear force. But against a growing nuclear power with a small arsenal, or against Islamic radicals who manage to commandeer an isolated nuclear-armed missile, an anti-missile defense could make a real difference. This leads us to what may be Rosen’s most striking recommendation. “Duck and cover” is back! In a post-proliferation world, we are going to be raising another generation of children (probably several generations of children) marked by nerve-wracking “retention drills.” And get ready…the fallout shelter is coming back, too. Given the Soviets’ overwhelmingly large nuclear arsenal — capable of turning the entire United States to dust in the event of a major nuclear exchange — fallout shelters came to seem like a joke. But when dealing with a possible strike from a single weapon, or at most a mere handful of weapons, the logic of the fallout shelter is compelling. We’re going to need to be able to evacuate our cities in the event of a direct attack, or to avoid radiation plumes from cities that have already been struck. Tens or hundreds of thousands of lives could be saved by such measures. But what about the problem of retaliation? Is there a middle way between the seemingly intolerable option of doing nothing to respond to a nuclear strike on New York or Washington, and indiscriminate nuclear retaliation against a country that may not even have attacked us? Rosen says the answer is a massive conventional campaign to take over and transform the countries that have struck us. That may seem intolerable now, but the public will demand no less in the wake of a nuclear attack on American soil. So this is the upshot of Rosen’s remarkable article. Now let’s think through the implications. Dead Doves For starters, the dovish Democrats are doomed. In “Hawkish Gloom,” I pointed in broad terms to the imminent hawkification of the United States. Well, Rosen’s detailed account of a post-proliferation world makes it clear that the revitalized George McGovern-Howard Dean wing of the Democratic party cannot survive much past the moment when Iran gets the bomb. As soon as that happens, we’re going to plunged into a proliferation crisis and a new Cold War, at least as dangerous as the first Cold War (arguably more so). At that point, the Democrats are going to beg Joe Lieberman to come back and give them his blessing. It turns out that we really are going to see a purge of the Democratic doves, and the accession of a Truman-like party, although it will probably take quite a few election cycles before the Democrats finally manage to remove taint of their Ned Lamont wing. Funny how the very thing the doves don’t want — a preemptive strike on Iran, is the only thing that can save them. A nuclear Iran, followed by cascading proliferation throughout the Middle East and beyond, means the death of the dove. Even a negotiated and verifiable agreement to put an end to Iran’s nuclear program is inconceivable without the sort of credible threat of force the doves have made impossible to sustain. A fully nuclearized, multi-polar Middle East will put us onto a permanent war footing. With Americans building fallout shelters, running evacuation drills, and otherwise preparing for a terrorist nuclear strike, dovishness won’t even be an option. Our political choices will probably be of two types. Exactly how hawkish shall we be, and how shall we shape our alliances? After Iran gets the bomb, the fantasy that we can handle the post-9/11 world with our tiny military is going to disappear. As Rosen points out, the only middle way between helpless acceptance of nuclear terror and massive nuclear retaliation against countries that may not even have attacked us, is going to be through conventional invasions. Before, and certainly after a nuclear attack (even a terrorist and/or Iranian nuclear strike on Israel or Saudi Arabia), Americans will be forced to raise a large army capable of transforming the Middle East before final Armageddon strikes.

## adv 3

#### Adv 3 is shipping

#### The industry will collapse—US and UK need to shift to SMRs

David Black, The National, 2/1/12, Atomic ships just over the horizon, www.thenational.ae/thenationalconversation/industry-insights/shipping/atomic-ships-just-over-the-horizon#full

The merchant shipping industry is hoping to go nuclear.

Despite the reactor disaster at the Fukushima power station in Japan last year and the fallout that blanketed the nuclear sector, the cargo ships and tankers of the future could one day be powered by atomic energy.

Last month, in the German port city of Hamburg, delegates at a conference on marine propulsion discussed the progress being made to design and build a new generation of merchant ships to be powered by onboard nuclear reactors.

The current research focus is on power plants for liquefied natural gas (LNG) carriers and oil tankers huge ships common in the waters of the Gulf. But that is not all as the shipping industry believes there is equal scope for container ships and bulk carriers to be fuelled by atomic energy. But they will not be cheap.

"The purchase price of the nuclear propelled ship would be considerably greater than that of an equivalent conventional ship," says John Carlton, a professor of marine engineering at the City University London, one of the keynote speakers at the forthcoming Hamburg conference.

However, for the conventionally propelled ship, the through-life fuel costs are high and are likely to rise further, especially with any introduction of carbon tax.

In contrast, the price of uranium enriched to commercial levels is much cheaper than conventional fuels. Therefore, the fuel costs become very much less for the nuclear ship.

The Russians already have two nuclear powered ice breakers-cum-cruise ships and a freighter plying their Arctic waters.

The marine engine manufacturers Babcock, and the international ship classification society Lloyd's Register, are already far advanced in research and development work and despite the technical and political hurdles they face, both believe the age of the nuclear-powered merchant ship will soon be with us.

The main drivers are the rising cost of traditional fuel, and the coming tranche of emissions regulations aimed at limiting the world's merchant fleet's power to pollute. And those are big problems, says Prof Carlton.

The world merchant fleet has an installed power capacity of 410 million kW; that is 9 per cent of world electricity generating capacity. It costs a lot to power that using fossil fuels, and it generates a lot of greenhouse gases in the process. "Also, it is clear that there is a perception that CO2 and greenhouse gases present a significant threat for the future. [In that context] there is growing acceptance that the use of nuclear power for ship propulsion is beneficial," says Prof Carlton.

"Some countries are suggesting that serious consideration should be given to nuclear propulsion for merchant ships. In a recently produced UK government memorandum detailing options for decarbonising Britain by 2050, the section on international shipping suggests 'building and maintaining a new fleet of nuclear-powered container ships and passenger ships.'"

Lloyd's Register is leading a consortium made up of the Greek tanker operator Enterprises Shipping and Trading, the US engine designer Hyperion Power Generation and the British naval architect BMT Nigel Gee, **to examine the marine applications for** small modular reactors (**SMRs**) in tankers. "Changes in oil regulation are driving the shipping industry's move to nuclear power," says Vince Jenkins, a Lloyd's Register global marine risk advisor.

"By 2020, ships will have to switch from today's heavy fuel oil to distillate fuels to reduce NOx [nitrogen oxide] and SOx [sulphur Oxide] greenhouse gases, which will be expensive. Unlike other low-carbon forms of energy, only nuclear power would be powerful enough to be able to completely replace a diesel engine."

Babcock International Group Marine Division has already completed a study to investigate the commercial implications of developing a nuclear-powered LNG carrier, based on its work as the support **contractor for the Royal Navy's nuclear submarine** fleet.

#### The plan causes spin-offs to commercial shipping

Femenia 12

(Professor and Master of Marine Engineering Program Director at United States Merchant Marine Academy, Is The Time Right For Commercial Nuclear Powered Vessels? August, http://higherlogicdownload.s3.amazonaws.com/SNAME/ee3b8f97-c746-4d85-bede-cd348a202053/UploadedImages/Is%20The%20Time%20Is%20Right%20For%20Commercial%20Nuclear%20Powered%20Vessels-J.Femenia%20(Full%20Paper-080812).pdf)

Most likely the development of one or more appropriately sized reactors, solely for use in powering commercial vessels, is economically unjustifiable. Fortunately there are a number of domestic and international individual and corporations interested in producing small modular reactors (SMRs). The goal of these individuals and companies is to essentially produce small nuclear “factory assemble” reactors that would primarily be used for distributed power generation to augment the gegawatt size reactors powering national electrical grids. At the Commercializing Small Modular Reactor Summit 2012, held in Washington, D.C. July 17-19 numerous papers and discussions were presented related to SMRs ranging from light water reactors system derivatives to high temperature gas cooled reactors. Topics ranging from fuel handling and reprocessing to regulatory issues were discussed at the conference. If and when the SMR’s become available, the marine industry could take advantage of their availability to design, build and operate nuclear powered commercial ships. This possibility could be greatly enhanced if there was a clear interest by the commercial shipping industry for fast, pollution free ships and were willing to consider nuclear powered vessels. If such an interest were expressed and an appropriate body of technical experts, such as T&R Panel M-48, opened discussions with nuclear industry representatives, regulatory agencies and classification societies, the design of the SMR’s could be influenced in a manner that would make one or more of the “off the shelf” SMRs relatively easily adopted for ship propulsion. The incentive for potential SMR manufactures to consider “marinizing” one or more of their units is simply to increase the potential market for appropriate units.

#### Solves extinction

Brownrigg, director general of British Chamber of Shipping, 2007, Speech to the Party Fringe meetings: Shipping – An Answer To Global Warming, http://www.findthatdoc.com/search-20687997-hDOC/download-documents-d-g-labour-party-fringe-sep-2007-doc.htm

Somewhat provocatively, we’ve called this meeting ‘Shipping – an answer to Global Warming’. Before I explain why – and why we believe that statement is true – I’d like to look quickly at the nature of the industry we’re considering. Shipping is indispensable to the way we – both here in the UK and people all over the world – live our lives today. The great wealth and comfort we enjoy today is possible only because of the shipping industry. 95% of the UK’s goods, by volume, are transported by ship. I think that bears repeating – 95% of our goods are transported by ship. And internationally 90% of all world trade is moved by sea. Look around you – at the food you eat, the clothes you are wearing, your children’s toys, the car you drive, and probably even the chairs you’re sitting on – virtually everything has come here on a ship. In many cities, shipping is what keeps the lights on at night. Without shipping, half the world would starve and half the world would freeze. For the UK, a small country with a high population density and the 5th largest trading economy in the world, the simple truth is that the country does not have the capacity to sustain its population – even at subsistence level – without external input. Shipping isn’t just vital to our way of life; for us it’s vital to life itself. Just a temporary suspension of shipping and ports activities in the UK would cause panic buying, empty shelves and major food shortages. With the modern “just-in time” deliveries, many items would be unobtainable. Even the National Health Service would quickly run out of a wide range medicines and other supplies! Obviously then, unless we are willing to accept a slowdown in the economy, a significant decline in our standard of living – and even a rationing of essential supplies such as food, clothes and petrol – an improvement in shipping’s carbon footprint can’t be achieved by simply reducing the number of ships or the number of voyages. Shipping demand is a direct function of the demands of world trade. In fact, and as the title of title of today’s debate suggests, I believe that if we look at the issue of global warming more holistically, shipping’s efficiency in terms of greenhouse gas emissions means that, instead of looking at a reduction, we should look at ways of increasing the use of ships to transport our goods – and thereby reduce air and road transport. It is true that ships run on fossil fuels, that they emit carbon dioxide as a product of burning those fuels, and that carbon dioxide is a greenhouse gas. But it is also true that shipping is the most efficient way to transport goods in terms of CO2 emissions – this was clearly confirmed by Sir Nicholas Stern’s Report two years ago. Both we and he measure the potential harm done by reference both to the weight of cargo carried and the distance it is moved – for example, an over 8,000 tonne cargo ship emits about 15 grams of CO2 per tonne-kilometre compared to about 50 grams per tonne-kilometre for a heavy truck or 540 grams per tonne-kilometre for a modern aeroplane. Stern showed that globally all transport produces 14% of man-made CO2 emissions. All water transport – both inland and international shipping – produces 10% of this 14%, ie 1.4% of man-made emissions. And this is the industry that transports 90% of world trade.

#### British shipping key to the British Navy

John Prescott, Former Deputy Prime Minister, 1997, British shipping: Charting a new course, http://www.fisherassoc.co.uk/dbimgs/British%20Shipping%20Charting%20New%20Course.pdf

National security

14. The main defence function of the merchant fleet is to support and supplement Ministry of Defence (MOD) in-house assets and to participate in reinforcement and re-supply operations. To this end, certain categories of British shipping, including roll-on/roll-off vessels ('ro-ros'), product tankers and passenger vessels are designated as "strategic" ships. Whilst the MOD would plan in the first instance to charter shipping on the international market, using existing crews from the ships chartered, they recognise that there may be situations in which it would be necessary to use some British ships and/or British seafarers to undertake particular operational tasks.

15. The MOD's future requirements for merchant shipping flow from the Strategic Defence Review (SDR) in which enhancement of in-house strategic lift capabilities and capacity featured large. Decisions made in the light of the conclusions of the review include the acquisition of 4 additional roros to provide the new Joint Rapid Reaction Forces (JRRF) with guaranteed access to strategic sea lift. These ships, together with existing and proposed Service assets, will provide the core surface strategic lift requirements for the JRRF. Requirements for other classes of strategic ships such as product tankers and passenger vessels, and for any breakbulk shipping required for the transportation of ammunition, general stores and follow-on forces, will normally continue to be met by chartering on the open market.

16. The MOD consider that the current availability of British seafarers is sufficient to meet present operational requirements. However, the trends are adverse, not only in terms of the continuing fall in numbers (in particular of ratings), but in the increasing average age of British seafarers. Such trends take a long time to reverse and, unless they are reversed, a point will be reached where military operations in defence of our vital interests may be put at risk.

#### Solves nuclear war

Jeremy Blackham, Vice President of RUSI (Royal United Services Institute—top UK Think Tank) and the Editor of The Naval Review. He was formerly Deputy Chief of the Defence Staff (Equipment Capability) and recently retired as President of EADS UK, 2007, The Royal Navy at the Brink: Royal United Services Institute for Defense Studies Royal United Services Institute for Defense Studies, RUSI Journal, 152.2

Since SDR, the strategic horizon has become significantly darker. In addition to the substantial threat of unconditional terrorism, a variety of problematic regimes from Russia to the Middle East, Central Asia and West Africa have the ability to hold the Nation hostage over access to food, energy and raw materials. Since 9/11, strategic risk assessment usually starts with the now familiar threats from unconditional lslamist terror which have replaced Bombs and Russians as prime public concerns in international affairs. Maritime traffic surveillance and interdiction are a huge and invisible part of pre-empting terrorist Weapons of Mass Destruction (WMD). lslamist terror connects to latent Western energy insecurity via various sorts of regimes hostile to the West in the Middle East and central Asia, and with nuclear dimensions accumulating. The seabed remains largely unexplored, but exploration may well yield important resources within the common heritage, which are very likely to be causes of dispute. Latent threats to British food security, absent for two generations, also loom, in part in consequence of the downgrading of the strategic status of domestic food production, loss of domestic fisheries and the loss of Britain's special status in the antipodean markets. Both energy and food security also have maritime leading edges. Furthermore, geostrategically, Britain is located at the centre of the people of the world.

Take a compass pivoting on the Thames estuary and radius to the Cape of Good Hope. The circle it then sweeps embraces most of the people on earth. This correctly states the prospect of war among the people. It has a huge and ineradicable maritime dimension, but it also tells the new air/land/sea story that will renovate the concept of 'joint' operations (see Fallacy 4 above).3 The three envelopes are inextricably interconnected. If Great Britain is the Keep, then the Bailey is no longer the Channel: it is the cursor between the German and Russian spheres of influence; and the Moat extends to the ends of the earth. All must be engaged if any is to be kept safe. In so doing, the geostrategic influence of the sea-lanes does not change, and for the West, the control of the two ship canals (Panama and Suez) and their approaches, the five key choke points (Channel; Gibraltar; Red Sea; Hormuz; Malacca Straits) and the two Cape passages (Horn and Good Hope) which lock up the world, are undiminished priorities. The British people therefore remain as dependent as ever, and arguably more so, on maritime trade; but because their personal links to seafaring are now minimal, paradoxically, awareness of this dependence has shrunk also. They suffer from seablindness.4

To this general picture is added another, more specific and more recent. The explosion of economic activity in the demographic superpowers of India and China will put further pressure on energy resources, food supplies and maritime traffic to supply both (around 80 per cent of fossil fuel goes by sea). Pressures in tight markets all around are produced by recent Chinese and soon Indian demand for all commodities as the demographic superpowers of the twenty-first century aspire to and single-mindedly pursue Western standards of living. China's take-off is a principal unintended consequence of 9/11, which halted the then abrupt deterioration in Sino-American relations. The Indian and Chinese Navies are growing quickly. Both are adding significant surface combatant and maritime air capability potentials. In India a new aircraft carrier is building with IOC (initial operating capability) 2011, together with around thirty other warships. In the Chinese case, re-building is thought to be the most likely initial route, through discreet reactivation of former Soviet/Ukrainian vessel, the Varyag (Kuznetsov class from the final days of the USSR) thus adding to its already considerable submarine navy.5 The demonstrated growth and the expected future growth in Indian and Chinese naval power may intensify the impact of the issues indicated in the general picture, both with respect to the requirement for expeditionary intervention operations and that for maritime security. This demonstrates the need for the RN to continue to maintain its power projection forces but also for increased patrolling and large-scale seabasing to underpin sovereign and coalition actions and to bear our proper share of the communal burden, now and in the future.

#### Nuclear shipping revives US shipbuilding

Page, 10

(Former officer-British Navy & Columnist-The Register, 9/27, “Nuclear merchant ships could open up Arctic routes for real,” http://www.theregister.co.uk/2010/09/27/nuclear\_shipping/page4.html)

Certainly a reappearance of nuclear merchant ships could be excellent news for the UK shipping business in particular for Babcock Marine, the sole British operator of dockyards with nuclear expertise, one of only a few such companies in the world. Nations like China and Korea, with their far lower labour costs, have stolen away most of Blighty's business in regular shipbuilding and maintenance: but, mostly lacking nuclear navies, they lack nuclear yards and expertise. China has a handful of nuclear subs, but they are considered primitive by Russian or Western standards and aren't thought to be very reliable or seaworthy**. In a world of nuclear-powered commercial shipping**, French, British and US dockyards accustomed to working on nuclear warships **to high safety standards would have a** major advantage. Lloyds and its US and French counterparts might find the associated knowhow a useful lever for winning business from cheaper (and perhaps even more unscrupulous) class societies elsewhere. In particular, a lot of flag-of-convenience states effectively delegate the running of their shipping safety bureaucracy to class societies, and international law requires a nuclear merchant ship's flag state to do a lot of paperwork. Extra nuclear training for crews would tend to offer more opportunities for Western sailors, too, even if the ships still tended to fly flags of convenience. Rolls-Royce, the UK's builder of nuclear reactors for ships, would also be one of very few competitors for lucrative new business.

#### Industry collapsing now—impact is SCS conflict and hegemony

Seth Crospey, Hudson Institute, 4/18/12, “The U.S. Navy Shipbuilding Plan:Assumptions and Associated Risks to National Security”, armedservices.house.gov/index.cfm/files/serve?File\_id=4949056c-5547-47ba-9039-a0bee34c8ef0

Knowledge of shipbuilding remains part of American manufacturing. But accelerating cost, an ageing workforce, reduced orders for warships, and an uncertain future risk the nation’s ability to turn out sufficient numbers of vessels at affordable prices and profitably enough to keep shipbuilding companies alive. The destabilization of the American shipbuilding industrial base is one reason that the cost of warships is outpacing the rate of inflation. The Navy’s reduced procurement of ships over the past twenty years has caused the industry to contract, lay off workers, and in general to become less reliable. This has driven up the cost of labor and the cost of construction materials. The fewer ships the Navy buys, the less lucrative the industry is for skilled workers. As the cost of labor rises shipbuilders are increasingly pressed to attract and train qualified personnel. The negative trends reinforce each other. As younger workers are dissuaded from seeking employment or remaining in the industry by the prospects of sporadic employment those who remain—the existing workers—age. The cycle is self-defeating. Paying older workers increases overhead costs and makes it increasingly expensive to invest in the training and education of a younger workforce. The destabilization of the industrial base also causes costs to rise since many of the materials and products that go into building Navy ships are not useful for other purposes. Since the Navy is buying far fewer ships now than it did in the 1980s, many shipyards rely on a single source for necessary materials. With a virtual monopoly on these products, the suppliers have in large part the ability to name their price. The inefficient manner in which the shipyards acquire these materials drives up labor and overhead costs. The solution lies in stabilizing the American shipbuilding industry. This means that the Navy must either increase its orders of ships and/or improve its business practices, for example disciplining the changes it requires of shipbuilders once orders have been placed and vessels are under construction. Buying and stockpiling spare parts for ships that are already in service and whose need for regular maintenance and repair is well known would also help provide stability for the American shipbuilding industry. In a study conducted on the subject in 2006, the RAND Corporation concluded that the rising costs of building ships is the result of a combination of unsteady U.S. Government procurement rates and a “monopsony relationship” between the government and the shipbuilders. In a monopsony a single purchaser is faced with a host of sellers. Because there is so little American shipbuilding outside of what the Navy purchases, U.S. firms are at the commercial mercy of the 9 percent of the Navy budget devoted to buying ships. A 2005 Government Accountability Office report attributed cost increases in shipbuilding to instability in the entire industry, the difficulty in recruiting and training qualified personnel, high rates of skilled personnel turnover and the shipbuilders’ dependence on a rapidly shrinking supplier base. Finally there are the consequences if U.S. seapower continues to decrease and proves unable to meet even the reduced goals it has set for itself. History is a good guide. Nations in the middle like to side with the winner. During our Civil War British political leadership considered recognizing the Confederacy but was eventually dissuaded by Union military success. In World War II Sweden declared neutrality but grew increasingly amenable to Allied requests as Germany’s military position worsened. Romania initially sided with Germany in the same war but changed sides following U.S. attacks on their oil fields and a coup that deposed the proGerman dictator, Antonescu. Bulgarians followed a similar path from siding with the Nazis to switching their allegiance to the Allies in 1944. Saudi Prince Bandar, acknowledging China’s increasing international prominence and power visited Beijing last year and met with President Hu. American weakness at sea, especially in the Indo-Pacific will change the current military, diplomatic, and commercial character of the region. Whether the U.S. fleet shrinks because of too little funding or because unreformed procurement practices have raised the price of ships or because ships have been called home to save on operational expense, the result is the same. While we were once present in strength, we would be no more. A nation burdened with massive debt whose ability to shape world events has been limited in tandem with its capacity to invest in research and technology will have more and more trouble finding markets. China’s potential hegemony would not only force its neighbors’ to reconsider whether the U.S. is a reliable ally. It would also become an increasingly powerful magnet for trade in the region—at the expense of U.S. commerce. Unlike the U.S. whose seapower has protected global sea lanes that other states have used to their benefit China has a different set of values. It views with suspicion a liberal trading system notwithstanding the benefits received from it. China’s friends include Iran and North Korea. Beijing is a poor candidate to support the international order that has been the keel of U.S. foreign and security policy for a century. Waning U.S. seapower is an invitation that China will regard as a complement to its rising military and navy in particular. It foreshadows a coercive resolution of territorial disputes in the South China Sea, the likelihood of an increased regional arms race, and the troubling international perception that the U.S. is—or has—abandoned its role as a great power. American seapower is the strategic keel of our foreign and security policy. Reducing it would be an exercise of history-making shortsightedness. Restoring it would be an act of statesmanship from which Americans and all who cherish political liberty would benefit for the remainder of this century. Thank you.

#### Extinction

Wittner 11

(Lawrence S. Wittner, Emeritus Professor of History at the State University of New York/Albany, Wittner is the author of eight books, the editor or co-editor of another four, and the author of over 250 published articles and book reviews. From 1984 to 1987, he edited Peace & Change, a journal of peace research., 11/28/2011, "Is a Nuclear War With China Possible?", www.huntingtonnews.net/14446)

While nuclear weapons exist, there remains a danger that they will be used. After all, for centuries national conflicts have led to wars, with nations employing their deadliest weapons. The current deterioration of U.S. relations with China might end up providing us with yet another example of this phenomenon. The gathering tension between the United States and China is clear enough. Disturbed by China’s growing economic and military strength, the U.S. government recently challenged China’s claims in the South China Sea, increased the U.S. military presence in Australia, and deepened U.S. military ties with other nations in the Pacific region. According to Secretary of State Hillary Clinton, the United States was “asserting our own position as a Pacific power.” But need this lead to nuclear war? Not necessarily. And yet, there are signs that it could. After all, both the United States and China possess large numbers of nuclear weapons. The U.S. government threatened to attack China with nuclear weapons during the Korean War and, later, during the conflict over the future of China’s offshore islands, Quemoy and Matsu. In the midst of the latter confrontation, President Dwight Eisenhower declared publicly, and chillingly, that U.S. nuclear weapons would “be used just exactly as you would use a bullet or anything else.” Of course, China didn’t have nuclear weapons then. Now that it does, perhaps the behavior of national leaders will be more temperate. But the loose nuclear threats of U.S. and Soviet government officials during the Cold War, when both nations had vast nuclear arsenals, should convince us that, even as the military ante is raised, nuclear saber-rattling persists. Some pundits argue that nuclear weapons prevent wars between nuclear-armed nations; and, admittedly, there haven’t been very many—at least not yet. But the Kargil War of 1999, between nuclear-armed India and nuclear-armed Pakistan, should convince us that such wars can occur. Indeed, in that case, the conflict almost slipped into a nuclear war. Pakistan’s foreign secretary threatened that, if the war escalated, his country felt free to use “any weapon” in its arsenal. During the conflict, Pakistan did move nuclear weapons toward its border, while India, it is claimed, readied its own nuclear missiles for an attack on Pakistan. At the least, though, don’t nuclear weapons deter a nuclear attack? Do they? Obviously, NATO leaders didn’t feel deterred, for, throughout the Cold War, NATO’s strategy was to respond to a Soviet conventional military attack on Western Europe by launching a Western nuclear attack on the nuclear-armed Soviet Union. Furthermore, if U.S. government officials really believed that nuclear deterrence worked, they would not have resorted to championing “Star Wars” and its modern variant, national missile defense. Why are these vastly expensive—and probably unworkable—military defense systems needed if other nuclear powers are deterred from attacking by U.S. nuclear might? Of course, the bottom line for those Americans convinced that nuclear weapons safeguard them from a Chinese nuclear attack might be that the U.S. nuclear arsenal is far greater than its Chinese counterpart. Today, it is estimated that the U.S. government possesses over five thousand nuclear warheads, while the Chinese government has a total inventory of roughly three hundred. Moreover, only about forty of these Chinese nuclear weapons can reach the United States. Surely the United States would “win” any nuclear war with China. But what would that “victory” entail? A nuclear attack by China would immediately slaughter at least 10 million Americans in a great storm of blast and fire, while leaving many more dying horribly of sickness and radiation poisoning. The Chinese death toll in a nuclear war would be far higher. Both nations would be reduced to smoldering, radioactive wastelands. Also, radioactive debris sent aloft by the nuclear explosions would blot out the sun and bring on a “nuclear winter” around the globe—destroying agriculture, creating worldwide famine, and generating chaos and destruction.

#### Territorial disputes will cause escalating wars—the US is key

Webb 9/20/12

(Jim, Sen. Foreign Relations Committee, Former Secretary of the Navy, also served as the first Assistant Secretary of Defense for Reserve Affairs, “Hearing on Maritime Territorial Disputes and Sovereignty Issues in Asia” Opening Remarks, September 20, 2012, Congressional Testimony)

Today, the East Asian and Pacific Affairs Subcommittee will consider the impact of recent and ongoing maritime territorial disputes and sovereignty in Asia, one of the most critical issues of strategic importance for the United States and for the entire Pacific region. I have written and spoken about this issue for many years, since long before I entered the Senate. It was the subject of the first substantive hearing I held as chairman of this subcommittee, in July 2009 and it probably will be the subject of the last substantive hearing that I am holding as the chairman of this subcommittee. Unfortunately, since that time the disagreements over sovereignty and the potential for conflict have only increased. In addition to the much-publicized “pivot” into East Asia, it is imperative that the United States policy be based on a clear set of principles that everyone here at home and in the region can understand, and from which our enduring relationships can continue to grow. Throughout my entire professional life I have worked to emphasize the importance of a strong United States presence in East and Pacific Asia. To state the obvious, the United States has strong, enduring, vital interests in East Asia, and East Asia would be a far more volatile place if the United States were to recede from the region. Since World War II, our country has proved to be the essential guarantor of stability in this region, even as the power cycle shifted from Japan to the Soviet Union and most recently to China. Economically and politically, all of East Asia and the Pacific has benefited from the stability that has been made possible by our involvement in this region. I reiterate this point in order to emphasize that neither this hearing nor any other comments and writings that have been made over the years by me are intended to diminish or discourage the evolution of our larger relations with China. The great value that the United States has added to the complex historical mix of East Asia transcends any one country. The concerns that are raised today would have been raised just as quickly if they were directed at Japan during the 1930s, or the Soviet Union when I was a Department of Defense executive in the 1980s. The United States does not seek hegemony in this region, nor does it seek containment. Its vital interest is stability, which allows countries of all different populations and sizes the opportunity to resolve their differences without fear of intimidation or the tragic consequences of war. And history teaches us that when stability is lost in East Asia, violence replaces it. The strong presence of the United States in the Pacific Asia region since World War II has been invaluable in the economic development and growth of more mature political systems throughout the region. This was true even in our frequently misunderstood effort in Vietnam. As Minister Mentor Lee Kuan Yew of Singapore commented in his memoir From Third World to First, “Although American intervention failed in Vietnam, it bought time for the rest of Southeast Asia….America’s action enabled non-communist Southeast Asia to put their own houses in order….Had there been no U.S. intervention, the will of these countries to resist would have melted, and Southeast Asia would have most likely gone communist. The prosperous emerging market economies of ASEAN were nurtured during the Vietnam War years.” During the Cold War, American policy encouraged a stronger relationship with China partly as a way to counter Soviet influence in East Asia. But massive American investment in China, coupled with the abrupt fall of the Soviet Union, helped enable a rapid and continuing power shift in favor of China, at the same time that American concerns in Pacific Asia were placed on the back burner due to the manner in which our attention was distracted by the volatility of events in Iraq, Afghanistan, and the Muslim world. In April 2001, following the collision of a Chinese fighter with a U.S. reconnaissance aircraft in international airspace, I warned of this development in an article in The Wall Street Journal, noting that “China engaged in a massive modernization program, fueled largely by purchases of Russian weaponry and bolstered by the acquisition of American technology,” which was having an impact on sovereignty claims in the East China Sea and the South China Sea. I warned in that article that China “has laid physical claim to the disputed Paracel and Spratly Island groups, thus potentially straddling one of the most vital sea lanes in the world… has made repeated naval excursions into Japanese territorial waters, a cause for long-term concern as China still claims Japan’s Senkaku Islands … and has never accepted the legitimacy of Okinawa’s 1972 reversion to Japan.” In 2006, in the final debate of my campaign for the United States Senate, I was allowed to ask my opponent one question. I asked him what he thought we should do about the sovereignty disputes in the Senkaku Islands. For a region in relative peace compared to the rest of the world, East Asia has a significant number of open territorial disputes, mostly with maritime borders. China and Japan both claim the Senkaku Islands in the East China Sea. China, Vietnam, the Philippines, Brunei, Malaysia, and Taiwan all claim sovereignty over all or part of the Spratly Islands, also in the South China Sea. Japan and Korea claim sovereignty over the Liancourt Islands, also known as Takeshima by Japan and Dokdo by Korea. Japan and Russia claim the Kuril Islands. These are open, active disputes. They involve not only claims to the land features but also claims to surrounding waters. And as all of these Asian nations have grown more prosperous, their sovereignty claims have become more fierce. It is the policy and the desire of the United States to pursue harmonious relations with each of these countries. We also recognize that these countries have long and complicated histories with each other which impact these claims. We take no sides in the resolution of such historical disputes. But we should not refrain from using our influence to discourage the use of military force or the unilateral expansion of claims of sovereignty. And it should be within the creative energy of our leadership to seek proper venues for the resolution of these disputes, particularly in the area of the South China Sea. What we have been witnessing over the past several years is not simply a series of tactical disputes. They are an accumulation of tactical incidents designed to pursue a larger strategic agenda. Virtually every country in the region understands that. It is the duty of the United States to respond, carefully and fully, to it. In the past week, our most important ally in Asia—Japan—has come to the brink of open conflict with our largest creditor—China—over claims to the Senkaku Islands. This latest incident represents years of growing tension. In 2008, Japan and China agreed to develop oil and gas resources in waters near the Senkaku Islands, in an effort to focus on the benefits of economic cooperation. This cooperation was cut short in 2010 when a Chinese fishing captain rammed a Japanese coast guard vessel near the islands. Last week, Japan’s government announced that it would purchase land on the Senkaku Islands from its private Japanese owner, in an attempt prevent the governor of Tokyo from purchasing this land and perhaps using it to stoke further controversy. A move that the Japanese government expected to relieve tensions was met with widespread misunderstanding, including a blast by China. Last Friday, China sent six maritime surveillance ships into waters around the islands—the largest-ever intrusion by China into this area. Anti-Japanese protests in China have reached a new height. These protests, abetted by the Chinese government, have damaged Japanese-owned businesses and caused considerable harm. On Tuesday, following a meeting with Secretary of Defense Panetta in Beijing, China’s defense minister stated that China reserves the right to act further against Japan in this dispute—which can only be read as a threat of the use of force. This threat has direct consequences for the United States. In 2004, the Bush administration stated clearly that the Japanese-U.S. Security Treaty obligations extended to the Senkaku Islands, which according to accepted principles of international law, are under the administrative control of Japan. Secretary Clinton reiterated this position in 2010 following the incident with the Chinese fishing boat. Given the recent incursion by China into waters around the Senkaku Islands, it is vital that we continue to state clearly our obligations under this security treaty. For several years, China has also demonstrated an increased willingness to use force in the South China Sea. Its claims in this area are based upon a roughly defined “9-dashed line”, the so-called “cow’s tongue,” encircling the South China Sea. In 2009, Chinese vessels harassed a U.S. maritime surveillance ship, the USNS Impeccable, and then a Chinese submarine collided with the sonar cable of the guided-missile destroyer USS John S. McCain while it was operating in the South China Sea. Last year on three separate occasions in March, May and June, China interfered with the maritime surveillance activities of Vietnamese and Filipino ships by cutting their cables. Following those incidents, I introduced a Senate resolution deploring the use of force by China and reaffirming U.S. support for the peaceful resolution of maritime territorial disputes. This resolution passed the Senate unanimously. This year in April, tensions in the Scarborough Shoal—an area less than 200 miles from the Philippines coast—escalated as a Filipino coast guard vessels investigated illegal fishing by China. In response, Chinese maritime enforcement ships, backed by PLA naval vessels, roped off the mouth of the lagoon denying access to the territory. China also retaliated through trade measures by blocking Filipino banana exports. In June, Filipino ships withdrew from the standoff due to weather concerns, but Chinese ships remained and are there today. In July, the Chinese government began implementing a decision to assert administrative control over this entire region. It established a prefectural-level government called Sansha on Woody Island located in the Paracel Islands chain, and appointed 45 legislators, a Standing Committee, a mayor and a vice mayor. Woody Island, also called Yongxing, has no indigenous population, no natural water supply. The jurisdiction of this new prefecture extends to more than 200 islets and over 2 million square kilometers of water—in other words, virtually the entire South China Sea. This political shift has been matched by economic and military expansion. In late June, the China National Offshore Oil Corporation (CNOOC) opened bidding on oil blocks that fall within Vietnam’s exclusive economic zone and establishing overlap with oil blocks that Vietnam itself is developing—some in partnership with United States firms. Within days of the Sansha prefecture, China’s Central Military Commission announced that it would deploy a garrison of soldiers to guard the area, and conduct regular combat-readiness patrols in the South China Sea. Other countries in the South China Sea have been actively working to reinforce their claims in the face of such developments. In June, Vietnam passed a new Maritime Law that restates Vietnam’s claim to the Paracel Islands and Spratly Islands. The Philippines has been working through the United Nations Commission on the Limits of the Continental Shelf to delimit its expanded continental shelf and clearly define its maritime boundaries. All countries are seeking to benefit from the resources in the region, claiming mineral development rights or fishing rights. However, China’s actions this past year go a step farther in attempting to expand administrative and physical control over areas in the South China Sea previously out of its internationally recognized jurisdiction. These incidents have coincidentally been occurring near the anniversary of Japan’s September 18, 1931, invasion of Manchuria. Historian Barbara Tuchman noted that the failure of the international community, and particularly the League of Nations to respond to the Mukden incident at that time “brewed the acid of appeasement that…opened the decade of descent to war” in Asia and beyond. The precedent for Munich was set in Manchuria and China lived through the consequences of the international community’s failure to address the unilateral actions taken against its territory. One hopes the present government of China will appreciate the usefulness of international involvement in finding solutions to the increasingly more hostile sovereignty issues in Northeast Asia and in the South China Sea. All of East Asia is watching the United States’ response to these recent Chinese actions in the South China Sea and East China Sea, particularly the countries of ASEAN, with whom we have shared expanding relations, and Japan and the Philippines, two countries with whom we share the solemn commitment of being treaty allies.

Goes nuclear

Chakraborty 10

(United Service Institution of India“The Initiation & Outlook of ASEAN Defence Ministers Meeting (ADMM) Plus Eight,” pg online @ <http://www.usiofindia.org/Article/?pub=Strategic%20Perspective&pubno=20&ano=739>)

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

#### British naval power key to enforce Africa marine conservation programs

Geoffrey Till, professor of maritime studies in the Defence Studies Department, King’s College London, and director of the Corbett Centre for Maritime Policy Studies, 2010, GREAT BRITAIN GAMBLES WITH THE ROYAL NAVY, http://www.usnwc.edu/getattachment/42a6d74d-a770-4f61-94f6-9386d0f37a2a/Great-Britain-Gambles-with-the-Royal-Navy.aspx

Preventing and Deterring Conflict

Prevention and deterrence may well head off incipient problems before they become crises for the system. Here the main naval contribution to national and global security could well lie in what does not happen. Maritime power is as much about preventing conflict as about winning it. The Royal Navy’s role in helping guard Iraq’s two critical oil platforms against attacks by insurgents and its successful training program to prepare the Iraqi navy and marines to assume that responsibility themselves illustrate deterrence and prevention, respectively. Together they reduce the future need for external countries to concern themselves with Iraqi and Gulf security.

The prevention of conflict is seen to depend in large measure on the benign presence of naval forces able to develop sustainable relationships with local states; to help states build up their capacity to defend themselves against such major problems as climate change, humanitarian disaster, poor governance, and the like; and, if necessary, to reassure them against prospective adversaries. Prevention may also call for constructive capacity-building engagement, especially in the good-order tasks discussed earlier, since, as the piracy problem in the Gulf of Aden shows, a lack of good governance in one area may result in security threats that challenge the system.

The piracy situation off Somalia and in the Gulf of Aden illustrates the consequence of a failure of governance at sea. The Royal Navy is taking a leading role in this long campaign to address the consequences of this; it established and led the European Union (EU) Operation ATALANTA and until recently provided the flagship for the Standing NATO Maritime Group 2 in the Gulf of Aden.33 The United Kingdom was also instrumental behind the scenes in setting up the legal arrangements with Kenya that allowed the authorities there to prosecute captured pirates on behalf of the international community. Better by far, however, would it have been for naval forces to have contributed proactively to Somalia’s capacity to defend and exploit sustainably its own marine resources, thereby preventing the situation from arising in the first place. “Stabilization,” the argument goes, should be about preventing conflict rather than restoring the situation afterward.

Ensuring good order at sea calls for the development of jurisdictional and enforcement capabilities in the countries of relevant regions, since disorder at sea often follows deficiencies of this sort. Although sometimes constrained rather than encouraged by the Ministry of Defence, the Royal Navy therefore takes capacity building very seriously and has demonstrated an impressive ability to get things done. The successful cruise and capacity-building port calls of HMS Endurance (far removed from its normal role in the South Atlantic) around the coast of Africa last year was, like the U.S. African Partnership Station, which it partly inspired, intended to reduce the prospects of the Somalia situation recurring elsewhere in the continent.34

#### Bluefin tuna collapse coming—international marine conservation key

WWF, 11

(5/11, “Illegal fishing in Libyan waters”, http://wwf.panda.org/about\_our\_earth/blue\_planet/news/?uNewsID=200332)

The groups, advocating for the rescue of the iconic fish species, the restoration of the Mediterranean marine environment and a centuries-old fishing industry, sent an urgent request to members of the organisation meant to manage the fishery – the International Commission for the Conservation of Atlantic Tunas (ICCAT). The call follows a late intervention from Libya that it will now allow fishing in its waters despite having no agreed fishing plan for the season. This would make any fishing activity by Libyan fleets illegal, according to ICCAT rules. The current unrest in Libya means there is no chance of effective monitoring and enforcement of the fishery in its waters, risking fatally undermining an internationally agreed recovery plan for the severely overfished species. There are reports that several Libyan vessels, legally unauthorized to fish for bluefin, have left Malta bound for Libyan waters. Greenpeace and WWF share the belief that ICCAT member states should have prevented their departure. Both organisations have reminded the French government of its particular responsibilities, since ten Libyan-flagged purse seine fishing vessels are owned by French interests. Illegal Libyan vessels are now ready to set sail for the Libyan fishing zone from European ports in France (Sète) and Malta. “Unless members of ICCAT take urgent action they will appear more determined than ever to undermine the management plans that at best will give Mediterranean bluefin a few years to survive,” said Sebastian Losada, Greenpeace International Oceans Policy Advisor. “If we want bluefin tomorrow, ICCAT must control the fishery – this is currently impossible in Libyan waters. This means ICCAT member countries must agree to suspend the fishery to protect their own plans to recover the species.” “Tough times require tough measures,” said Dr Sergi Tudela, Head of Fisheries at WWF Mediterranean. “The painstaking and fragile achievements of the last years are endangered by the maverick attitude of a small minority. Responsible members of ICCAT must rally to do what is necessary to save this species and fishery. Only vigorous action now can **prevent Atlantic bluefin tuna from plunging into a new Dark Age before it has even emerged from the last one.”** The letter also urged ICCAT members to take decisive action to prevent illegally caught bluefin tuna from entering global seafood markets, by better monitoring fishing and caging in the Mediterranean. The demands from the two groups follow Libya’s announcement that it will engage in illegal fishing for bluefin tuna this year, ignoring ICCAT’s request to avoid tuna fishing in Libyan waters, as the current political situation there would make monitoring and enforcement of fishing activities impossible. “It would be even more scandalous that in the current difficult situation affecting Libya, French interests would benefit from access to the fishing resources in Libyan waters,” said Sebastian Losada of Greenpeace. “The international community is responsible, more than ever, for the conservation of those resources for future generations.”

#### British naval power solves—key to enforce fishing conservation

Chris Trelawny, Officer in the British Royal Navy Reserve, Head of the Maritime Security Section of the International Maritime Organization (IMO), the specialized agency of the United Nations responsible for measures both to improve the safety and security of international shipping, and to prevent marine pollution from ships, 2007, The Naval Contribution to Sustainable Development in West and Central Africa: Royal United Services Institute for Defense Studies Royal United Services Institute for Defense Studies, The RUSI Journal, 152.5

One challenge is that not many States in West and Central Africa have coastguards, but many do have a navy,1 albeit one which acts in a coastguard role. Few have a navy large enough to be an effective military force capable of conducting traditional naval military and diplomatic functions independently, let alone the full range of constabulary tasks outlined above. Few, if any, of these States have the capability to maintain a credible maritime law enforcement presence in their own territorial waters, let alone in their EEZs.

Even in military-orientated African States, the perceived threat has traditionally been land-based and thus, the navy is often seen as the poor relation when it comes to budgets. As a consequence, navies themselves are under-resourced by comparison to the land and air forces and have to compete for scarce resources. This tends to make navies even more protective of their maritime roles and consequently more likely to oppose the creation of civilian coastguards.

As many of the governments of West and Central African States are indeed military in nature, and as several of these states have recently emerged from bloody civil wars, there is also a corresponding reluctance among donors to bolster military forces even for peaceful purposes. This reluctance, coupled with other donors' legal or doctrinal prohibitions on the provision of what could be seen to be military aid, is a major challenge to the development of an effective constabulary regime and sustainable fisheries for the region. (This has certainly been the case in other regions, for example in Latin America, where in the majority of states the maritime administration has been a subset of the navy.)

The IMO/MOWCA Integrated Coastguard Project

The MOWCA comprises twenty coastal States and five landlocked States stretching from Mauritania to Angola. Nineteen of the coastal States have ratified UNCLOS. Of those nineteen coastal States, fourteen claim EEZs of 200 nautical miles; one claims an EEZ to the Continental Shelf; one to the line of maritime delimitation; and one claims a 200 nautical mile fisheries zone. Two (plus the non-UNCLOS party) claim a territorial sea of 200 nautical miles.

In October 2006, the IMO and MOWCA convened a meeting in Dakar, Senegal to discuss the establishment of a system whereby the various national entities responsible for carrying out coastguard functions could co-operate both domestically and on a regional basis for the benefit of West and Central Africa as a whole.

The 'Forum on the Establishment of an Integrated Sub-regional Coastguard Function Network for West and Central African countries' (the Forum) was attended by over 160 participants and observers from twenty-two MOWCA Member States namely Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Congo, Côte D'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea Bissau, Guinea, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone and Togo; as well as representatives from international and regional institutions, regional maritime academies and MOWCA specialized agencies. Subjectmatter experts from the United Nations Division for Ocean Affairs and the Law of the Sea (UNDOALOS), the United Nations Office on Drugs and Crime (UNODC), the Office of the United Nations High Commissioner for Refugees (UNHCR), the Food and Agriculture Organization (FAO), the International Civil Aviation Organization (ICAO), INTERPOL, the Commonwealth of Dominica, France, Norway, the United Kingdom, and the United States, as well as IMO, also participated actively.

The Forum addressed issues including development of national legal frameworks; the technical challenges for the establishment of an integrated coastguard function network; the sustainable development of exclusive economic zones; and maritime security and law enforcement issues. This led to the adoption of a resolution listing twenty-two action points in a variety of disciplines, the operative paragraphs of which will form the basis of action plans to be developed for the implementation of the integrated coastguard function network, and which will facilitate the coordination of specialized agencies' and other donors' capacity and capability building programmes in their own areas of expertise.

In developing the concept of the integrated sub-regional coastguard function network, the focus was on the functions themselves and their intended outcomes, rather than on which particular entity was charged with carrying out the task. The intention was to enhance co-operation, communication and co-ordination between existing structures, rather than to create any new ones. There is no intention to create a single, multinational coastguard for the whole region; states are instead encouraged to establish a matrix of what needs to be done, identify any gaps in coverage, rationalize any unnecessary duplication and then to allocate the derived tasks to existing agencies accordingly in a coordinated way.

The ultimate aim of this project is for states in the region to meet their international treaty obligations and to realize the potential of their EEZs and to develop and maintain viable fishing industries, thus contributing to sustainable development throughout the region, consistent with the United Nations Millennium Development Goals.

Lost Opportunities

One of the core principles of the Forum was that the increased revenues generated by coastal states through correct management of sustainable fisheries and development of the EEZ, coupled with the processes involved in monitoring, control and surveillance of the EEZ, would also contribute to the enhancement of maritime security; countering piracy and armed robbery against ships, illegal migration and the trafficking of drugs, weapons and people; enhancing search and rescue capabilities; and the prevention of pollution and protection of the marine environment.

In the longer term, it was anticipated that increased prosperity, security and stability in the region would lead to further investment in other industries, such as food processing and tourism, which in turn would generate higher revenues for governments and promote further sustainable development throughout the region which could significantly reduce economic and illegal migration.

The importance of sustainable fisheries to West and Central Africa cannot be overstated. The region has significant fisheries resources which could contribute immensely to food security and export income. Well managed fisheries could also provide cheap animal protein for coastal communities (in Senegal and The Gambia, 40 per cent of animal protein is from fish) and sustain the livelihoods of thousands of fishermen and their families. Given the fish consumption patterns and the population growth rates in the region, more fish needs to be landed to meet the demand. Increasing pressure will therefore continue to be exerted on currently declining fisheries resources. Management of the fisheries to ensure sustainability should therefore be of prime concern to all the coastal states in the region.

Fishing is an important source of revenue for national economies. UN Food and Agriculture Organization (FAO) statistics indicate that in Mauritania, for example, fish landings amount to about 430,000 metric tons annually contributing 10 per cent to GDP, 22 to 29 per cent to the national budget, providing over 26,000 jobs and accounting for over 50 per cent of the foreign exchange earnings. In Senegal, earnings from the export of fishery products usually exceed 160 billion FCFA (approx. $280 million), about 20 per cent of earnings from exports. With annual fish landings of over 400,000 metric tons (80 per cent caught by artisanal fishermen), the Senegalese marine fisheries provide over 600,000 employment opportunities. In Cape Verde where most of the fisheries production is exported to the European Union (EU), fisheries products represent 63 per cent of the country's exports.2

The financial cost of illegal, unreported and unregulated (IUU) fishing is a serious global problem. Recent studies put the worldwide value of IUU catches at between $4.2 billion and $9.5 billion per year. While $1.25 billion comes from the high seas, the remainder is taken from the EEZs of coastal states. Losses from the waters of Sub-Saharan Africa amount to $0.9 billion per year.3 In the context of the West and Central African Region, 2.5 million tons of fish worth an estimated $1.3 billion is caught in the waters off the member states of the Sub-Regional Fisheries Commission (Mauritania to Sierra Leone). Of this, an estimated $790 million is caught by legal industrial vessels, $269 million is caught by smallscale fishers and $254 million is attributed to illicit fishing activities."

Developing the Role of Navies in the Integrated Coastguard Project

Although the IMO/MOWCA initiative is civilian in nature, it has distinct synergies with other navy-focussed initiatives conducted in the region, for example the United States-led Gulf of Guinea Maritime Safety and security Ministerial Conference held in Cotonou, Benin in November 2006; and the French-led 'Seminar on African Navies and Maritime Safety and security Missions' held in Lomé, Togo in June 2007.

As already intimated above, for most developing states (and for many developed states), having both a navy and a coastguard is not an affordable option. As navies are very unlikely to relinquish their maritime power bases willingly, governments and naval chiefs should therefore decide upon and clarify their navies' roles as strategic economic assets; and generate acceptance of the concept of the navy as a force for good within a co-ordinated national maritime policy framework. This needs to be done both internally, i.e., within Government; and internationally, in order to attract acceptance, technical assistance and investment from the international community. (A good example of such acceptance of the use of a navy for civilian purposes is the current programme of co-operation between the World Wildlife Fund and the Mozambican Navy in seeking to protect marine areas and species against illegal fishing. The pooling of scarce resources, such as boats and fuel, has resulted in the interests of both organizations being addressed more effectively.)

The co-ordinated national maritime policy framework should not only comprise the legislative basis for all of the previously-mentioned 'coastguard functions', but should also address coordination, co-operation and communication between all of the agencies having a stake in the marine domain.

At the national level, navies need to participate actively in national and local maritime security committees, engaging with other stakeholders and sensitizing them as to what naval assets can contribute to the civil maritime effort. The use of naval assets for patrolling ports and their approaches, anchorages and offshore installations; the provision of naval vessels as platforms to transport law enforcement officers into the maritime domain; sharing of the navy's situational awareness picture; and other 'sponsored' tasks, such as search and rescue, conducting hydrographie surveys and monitoring the marine environment for pollution prevention, would contribute significantly to a state's ability to meet its obligations for maritime safety and security. Such services could be provided on a 'user pays' basis, with appropriate billing arrangements between navies and client government departments. Law enforcement and other agencies would benefit from having platforms available when needed, without the considerable infrastructure costs associated with running, maintaining and crewing their own vessels; navies would benefit from the additional income as well as the training benefit of the operational experience gained and the associated increased morale from actually having several useful functions to perform.

#### Bluefin tuna collapse causes extinction

VOA, 10

(Voice of America News, “Bluefin Tuna Endangered by Overfishing,” 12/1, http://www.voanews.com/english/news/asia/Bluefin-Tuna-Endangered-by-Overfishing--111159869.html)

Predatory fish are at the top of the ocean food chain. They help keep the balance of marine life in check. Without their eating habits, an overabundance of smaller organisms might affect the entire underwater ecosystem. Some scientists say **such a shift could lead to a total collapse of the oceans**. Yet so far, those in charge of regulating international fisheries have done little to protect at least one endangered species. Scientists say this species is on the brink of extinction… and it is all our fault. "Nobody's free of blame in this game," said Kate Wilson. Kate Willson is an investigative journalist who recently exposed what she says is a $4-billion, black market trade in the sale of bluefin tuna. "Scientists tell us that **when a top predator like bluefin** or another big fish is depleted, that **will affect the entire ecosystem,**" she said. "Scientists say you better get used to eating jellyfish sashimi and algae burgers if you let these large fish become depleted because they **anchor the ecosystem**." Ecosystems are how living things interact with their environments and each other. Scientists agree they can change dramatically if a link disappears from the food chain. Government officials and members of environmental groups met in Paris in mid-November to discuss fishing regulations that may **affect all life on Earth**. Sue Lieberman is Director of International Policy with the Pew Environment Group: a Washington-based, non-profit agency. She says **the bluefin is in jeopardy.** "The fish is in worse shape than we thought, and that's why we're calling for the meeting of this commission to suspend this fishery ... to put on the brakes and say, 'let's stop," said Sue Lieberman. "Let's stop mismanaging and start managing the right way to ensure a future for this species.'"Both Lieberman and Willson say that greed, corruption and poor management of fishing quotas brought us to this point. "The quotas are designed to let fish recover, but quotas are more than scientists recommend, but even within quotas, **there's consistent lack of enforcement,** fraud, fish being traded without documents to the point where it's a multibillion dollar business that will cause the depletion of an incredible species," said Lieberman. Willson says that fishing the bluefin to near-extinction followed increased Japanese demand for fresh sushi starting in the 1970s and 80s. And fishing practices that target the two primary regions in which blue fin spawn: the Gulf of Mexico and the Mediterranean Sea. "You don't need a PhD in fisheries to know that's really not very smart," said Sue Lieberman. "If you want the species to continue into the future, you don't take them when they come to breed." And that practice shines light on a bigger problem. "Ninety per cent of all large fish it's estimated have been depleted," said Kate Wilson. "Bluefin is just a bellwether for what's happening to what's left of the world's large fish." "We're not saying there should be no fishing, but we are saying there should be no fishing like that," said Lieberman. "This isn't single individuals with a pole and a line; this isn't recreational fishermen; this is massive, industrial scale fishing. Governments can change this; this isn't an environmental threat that we throw up our hands and there's nothing to do about it." "If countries really want to protect the remaining stocks of bluefin, they have to get serious about enforcing the rules and listening to their scientists when they set catch limits," said Wilson. "Management of fish species on the high seas isn't just about making sure people have nice seafood when they go to a restaurant; it's **about the very future of our planet,"** continued Lieberman. "And we have to get management of the oceans correct and we can't keep … and governments can't keep acting like we'll take care of that next year. We'll worry about making money in the short term, we'll listen to the fishing industry; we'll worry about the ocean & the environment later. We don't have that luxury."

## t

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

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

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

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

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

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

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

## microgrid cp

#### Islanding capability is irrelevant if inputs are intermittent—baseload nuclear power key

Energy Collective, 5/10/12, Replacing nuclear with wind power: Could it be done?, theenergycollective.com/node/84553

Many people would like it to be theoretically possible to replace nuclear power with wind power, since the wind is a free resource. The way that I would like to approach the topic is to not discuss the source of power, but to discuss this question from the perspective of “intermittency.” Stating the question another way: Can an intermittent source replace a baseload power source for producing electricity? This question has nothing to do with how the electricity is generated, but everything to do with when the electricity is generated. The production of electricity involves understanding concepts such as capacity, capacity factor, and generation. These three concepts are often misunderstood and misused when comparing the generation of intermittent electricity with baseload generated electricity. It is sometimes useful to use a familiar analogy when explaining complicated topics. I will, therefore, use the automobile for this analogy, since many of us own a car and everyone is familiar with them. Capacity Here is the analogy: Suppose there is a car on the market that is very environmentally friendly. Its mileage is phenomenal! I call it a “super-green” car. This super-green car has the same horsepower as a conventional car. It will handle steep hills as well as a conventional car. It has the same 0 to 60 mph performance. The only difference is that when you try to start it in the morning, it will only start 25 percent of the time, and you can never predict on which day it will start. It runs, randomly, 25 percent of the time. Would you replace your conventional car with a super-green car to get you to work every day? To keep the analogy simple, let us assume that if the car starts on a particular day, it will also take you home at the end of the workday. If it doesn’t start on a particular day, however, it won’t start that day no matter how often you turn the starter key. To most people, the answer is obvious. Most of us would not hold on to a job very long if we randomly showed up at work only 25 percent of the time. So the answer is no, the super-green car cannot replace the conventional car. Horsepower is the equivalent of capacity in this analogy. An intermittent electrical power source with a capacity (or power capability when it is working) to generate 1000MW cannot replace a conventional power plant with a capacity of 1000MW. Even though the capacities are the same, the power plants are not equivalent. Yet capacity comparisons are made all the time, as if this somehow makes the power plants equivalent. They are not equivalent. Capacity factor Others would say that since the capacity factor is 25 percent (the car works 25 percent of the time), you would just need four cars to reliably get you to work every day. This is also not true, however. There is a chance that none of the cars will work on a particular day. As a matter of fact, this probability can be computed, if the probability of each car not working is independent of the other cars not working. It is 0.75 x 0.75 x 0.75 x 0.75 or (0.75)^4, which is equal to 32 percent. So if you owned four super-green cars, the probability of none of them working on a particular day is 32 percent. So, with four super-green cars, you get to work 68 percent of the time, which is better than 25 percent of the time, but it is still a long way from 100 percent of the time. Another problem with using capacity factor as an equalizing parameter is that there are times when more than one car will start. The extra cars, however, are of no value to you as far as getting to work is concerned. The extra working cars do not average out with the demand to get to work on time each day. They are working at the wrong time. Note that in the case of a wind farm, the probability of each turbine not working is not independent. If the wind doesn’t blow in a particular area, it will affect all wind turbines. The probabilities are not randomly independent. Therefore, wind farms must be in separate weather patterns, in order to significantly reduce the unavailable time. Generation A better equalizing parameter is generation. When the super-green car works, it generates highly economical miles. That parameter has its problems as well, however. The generation of economical miles can be increased simply by taking the long route to work. Those extra economical miles are of no value as far as getting to work is concerned. In the same way, generated electricity has no value unless there is a demand for it at the time that it is generated. This is because electricity has zero shelf-life. It must be consumed when it is generated. So, when generation cost comparisons are made between intermittent and baseload power sources, this presumes that the resulting electricity value is the same. This is actually not the case, because electricity generated when the demand for it is not certain does not have the same value as electricity that is generated when there is demand for it. There is no perfect equalization parameter when making comparisons between intermittent and baseload generated electricity. Capacity is by far the worst, next comes capacity factor, and the best is generation, but it is not perfect. Conclusion So, the conclusion is that intermittently generated electricity cannot replace baseload generation. Just like there is a chance that none of the super-green cars are working on a particular day, there is also a chance that no electricity is generated by an intermittent source. Hence, all the conventional power sources are still needed. Intermittent power sources can be of value, however, because they do save fuel in conventional power plants. But the economics are usually not very good at today’s fuel prices. In the car analogy, I compute that my 20-mile round-trip commute to work would save me about two gallons of gas a month if the super-green car gets double the mileage of my conventional car. At $4 per gallon, that is $8 per month saving. It is obvious that, from an economic point of view, this saving is nowhere near the hundreds of dollars required per month to own an extra car. Similarly, I wrote an article explaining that wind farms cannot be justified on an economic basis, except in Hawaii, where expensive oil is used to generate electricity. But perhaps using intermittent power plants can be justified environmentally. Perhaps not burning fossil fuels is worth the environmental benefit of not releasing as much greenhouse gases. Also, the fossil resource can be saved for other uses such as plastics. That argument breaks down, however, when the baseload generator is nuclear. Nuclear power does not generate greenhouse gases during operation. Saving the uranium for other uses is not applicable, because uranium has no other commercial uses. What exactly would we be saving it for? So, to answer the general question, can wind power replace nuclear? The answer is clearly no. No technology is perfect, and there is always some impact in everything we do. Nuclear has the capability to meet the electrical needs for humanity for a millennia. That is a very compelling reason to use it, versus using a technology that only works intermittently and requires keeping all the conventional generators that we already have.

#### Links to politics

Daniel Sater, 2011, Research Fellow at Global Green USA's Security and Sustainability Office, Military Energy Security: Current Efforts and Future Solutions, Global Green, globalgreen.org/docs/publication-185-1.pdf

Widespread development of microgrids will require large capital expenditures by the DOD and Congress. In the current climate of budget cuts, especially with regard to the DOD, any new spending is likely to attract heavy scrutiny. One of the benefits of allowing present trends to continue is that it does not require any new action by the DOD or Congress.

Microgrids remain a relatively new development and some base commanders might resist their implementation. Despite their advantages in cybersecurity over the large-scale smart grid, the DOD must make advances in cybersecurity to ensure that microgrids do not make the energy supply for military installations less secure instead of more so.

## thorium cp

#### Thorium reactors take 30 years

Tickell 12

Oliver Tickell, As a student of physics at St John's College, Oxford, Tickell holds a masters degree from Oxford University. He is a founding partner of Oxford Climate Associates and a member of the Oxford Geoengineering Institute, April/May 2012, "Thorium: Not ‘green’, not ‘viable’, and not likely", http://www.jonathonporritt.com/sites/default/files/users/Thorium%20briefing%20FINAL%203.7.12.pdf

Despite the resurgence of interest in the MSR / LFTR technology, there are no concrete plans to build even a single such reactor. China currently appears most likely to provide the funding necessary to develop LFTR technology due to that country's relatively large nuclear programme and the government's willingness to invest in new energy generation technologies. But even there any production-scale LFTR is unlikely to materialise for 20-30 years.

#### It still requires uranium

Tickell 12

Oliver Tickell, As a student of physics at St John's College, Oxford, Tickell holds a masters degree from Oxford University. He is a founding partner of Oxford Climate Associates and a member of the Oxford Geoengineering Institute, April/May 2012, "Thorium: Not ‘green’, not ‘viable’, and not likely", http://www.jonathonporritt.com/sites/default/files/users/Thorium%20briefing%20FINAL%203.7.12.pdf

3.1 Abundance of thorium relative to uranium Claim: Thorium is several times more abundant in the Earth's crust than uranium. Response: Thorium (232Th) is indeed more abundant than uranium, by a factor of three to four. But whereas 0.7% of uranium occurs as fissile 235U, none of the thorium is fissile. The world already possesses an estimated 1.2 million tonnes of depleted uranium (mainly 238U), like thorium a fertile but non-fissile material. So the greater abundance of thorium than uranium confers no advantage, other than a very marginal advantage in energy security to those countries in which it is abundant.

#### Commercialization’s’ impossible

Eifion **Rees 11**, The Guardian, “Don't believe the spin on thorium being a greener nuclear option”, June 23, <http://www.guardian.co.uk/environment/2011/jun/23/thorium-nuclear-uranium>

There is a significant sticking point to the promotion of thorium as the 'great green hope' of clean energy production: it remains unproven on a commercial scale. While it has been around since the 1950s (and an experimental 10MW LFTR did run for five years during the 1960s at Oak Ridge National Laboratory in the US, though using uranium and plutonium as fuel) it is still a next generation nuclear technology – theoretical. China did announce this year that it intended to develop a thorium MSR, but nuclear radiologist Peter Karamoskos, of the International Campaign to Abolish Nuclear Weapons (ICAN), says the world shouldn't hold its breath. 'Without exception, [thorium reactors] have never been commercially viable, nor do any of the intended new designs even remotely seem to be viable. Like all nuclear power production they rely on extensive taxpayer subsidies; the only difference is that with thorium and other breeder reactors these are of an order of magnitude greater, which is why no government has ever continued their funding.' China's development will persist until it experiences the ongoing major technical hurdles the rest of the nuclear club have discovered, he says. Others see thorium as a smokescreen to perpetuate the status quo: the world's only operating thorium reactor – India's Kakrapar-1 – is actually a converted PWR, for example. 'This could be seen to excuse the continued use of PWRs until thorium is [widely] available,' points out Peter Rowberry of No Money for Nuclear (NM4N) and Communities Against Nuclear Expansion (CANE). In his reading, thorium is merely a way of deflecting attention and criticism from the dangers of the uranium fuel cycle and excusing the pumping of more money into the industry. And yet the nuclear industry itself is also sceptical, with none of the big players backing what should be – in PR terms and in a post-Fukushima world – its radioactive holy grail: safe reactors producing more energy for less and cheaper fuel. In fact, a 2010 National Nuclear Laboratory (NNL) report (PDF)concluded the thorium fuel cycle 'does not currently have a role to play in the UK context [and] is likely to have only a limited role internationally for some years ahead' – in short, it concluded, the claims for thorium were 'overstated'. Proponents counter that the NNL paper fails to address the question of MSR technology, evidence of its bias towards an industry wedded to PWRs. Reliant on diverse uranium/plutonium revenue streams – fuel packages and fuel reprocessing, for example – the nuclear energy giants will never give thorium a fair hearing, they say. But even were its commercial viability established, given 2010's soaring greenhouse gas levels, thorium is one magic bullet that is years off target. Those who support renewables say they will have come so far in cost and efficiency terms by the time the technology is perfected and upscaled that thorium reactors will already be uneconomic. Indeed, if renewables had a fraction of nuclear's current subsidies they could already be light years ahead. All other issues aside, thorium is still nuclear energy, say environmentalists, its reactors disgorging the same toxic byproducts and fissile waste with the same millennial half-lives. Oliver Tickell, author of Kyoto2, says the fission materials produced from thorium are of a different spectrum to those from uranium-235, but 'include many dangerous-to-health alpha and beta emitters'. Tickell says thorium reactors would not reduce the volume of waste from uranium reactors. 'It will create a whole new volume of radioactive waste from previously radio-inert thorium, on top of the waste from uranium reactors. Looked at in these terms, it's a way of multiplying the volume of radioactive waste humanity can create several times over.' Putative waste benefits – such as the impressive claims made by former Nasa scientist Kirk Sorensen, one of thorium's staunchest advocates – have the potential to be outweighed by a proliferating number of MSRs. There are already 442 traditional reactors already in operation globally, according to the International Atomic Energy Agency. The by-products of thousands of smaller, ostensibly less wasteful reactors would soon add up. Anti-nuclear campaigner Peter Karamoskos goes further, dismissing a 'dishonest fantasy' perpetuated by the pro-nuclear lobby. Thorium cannot in itself power a reactor; unlike natural uranium, it does not contain enough fissile material to initiate a nuclear chain reaction. As a result it must first be bombarded with neutrons to produce the highly radioactive isotope uranium-233 – 'so these are really U-233 reactors,' says Karamoskos. This isotope is more hazardous than the U-235 used in conventional reactors, he adds, because it produces U-232 as a side effect (half life: 160,000 years), on top of familiar fission by-products such as technetium-99 (half life: up to 300,000 years) and iodine-129 (half life: 15.7 million years).Add in actinides such as protactinium-231 (half life: 33,000 years) and it soon becomes apparent that thorium's superficial cleanliness will still depend on digging some pretty deep holes to bury the highly radioactive waste. With billions of pounds already spent on nuclear research, reactor construction and decommissioning costs – dwarfing commitments to renewables – and proposed reform of the UK electricity markets apparently hiding subsidies to the nuclear industry, the thorium dream is considered by many to be a dangerous diversion. Energy consultant and former Friends of the Earth anti-nuclear campaigner Neil Crumpton says the government would be better deferring all decisions about its new nuclear building plans and fuel reprocessing until the early 2020s: 'By that time much more will be known about Generation IV technologies including LFTRs and their waste-consuming capability.' In the meantime, says Jean McSorley, senior consultant for Greenpeace's nuclear campaign, the pressing issue is to reduce energy demand and implement a major renewables programme in the UK and internationally – after all, even conventional nuclear reactors will not deliver what the world needs in terms of safe, affordable electricity, let alone a whole raft of new ones. 'Even if thorium technology does progress to the point where it might be commercially viable, it will face the same problems as conventional nuclear: it is not renewable or sustainable and cannot effectively connect to smart grids. The technology is not tried and tested, and none of the main players is interested. Thorium reactors are no more than a distraction.'

#### No escalation

Collins, prof poli sci – Notre Dame, and Wohlforth, prof govt – Dartmouth, ‘4

(Kathleen and William, <http://www.dartmouth.edu/~govt/docs/15-Central%20Asia-press.pdf>)

While cautious realism must remain the watchword concerning an impoverished and potentially unstable region comprised of fragile and authoritarian states, our analysis yields at least conditional and relative optimism. Given the confluence of their chief strategic interests, the major powers are in a better position to serve as a stabilizing force than analogies to the Great Game or the Cold War would suggest. It is important to stress that the region’s response to the profoundly destabilizing shock of coordinated terror attacks was increased cooperation between local governments and China and Russia, and—multipolar rhetoric notwithstanding—between both of them and the United States. If this trend is nurtured and if the initial signals about potential SCO-CSTO-NATO cooperation are pursued, another destabilizing shock might generate more rather than less cooperation among the major powers.

Uzbekistan, Kyrgyzstan, Tajikistan, and Kazakhstan are clearly on a trajectory that portends longer-term cooperation with each of the great powers. As military and economic security interests become more entwined, there are sound reasons to conclude that “great game” politics will not shape Central Asia’s future in the same competitive and destabilizing way as they have controlled its past. To the contrary, mutual interests in Central Asia may reinforce the broader positive developments in the great powers’ relations that have taken place since September 11, as well as reinforce regional and domestic stability in Central Asia.

#### No investors

Tickell 12

Oliver Tickell, As a student of physics at St John's College, Oxford, Tickell holds a masters degree from Oxford University. He is a founding partner of Oxford Climate Associates and a member of the Oxford Geoengineering Institute, April/May 2012, "Thorium: Not ‘green’, not ‘viable’, and not likely", http://www.jonathonporritt.com/sites/default/files/users/Thorium%20briefing%20FINAL%203.7.12.pdf

4.3 Thorium and LFTRs – investment outlook The development of thorium / LFTR technologies represents a poor investment for national governments, utilities and private investors given:  the marginal benefits to be derived from using thorium fuels in existing reactor designs;  the very long-term nature of any benefit that may be realised from LFTRs, of the order of half a century;  the uncertainty as to whether the very significant technical challenges of the LFTR will ever be overcome;  the possibility that the materials used for reactor construction may degrade more rapidly than anticipated, causing early shut-down;  the likely very high cost of LFTR electricity – especially when compared against the anticipated low future cost of electricity from renewable sources, solar in particular, over the applicable time frame.

## prolif da

#### The Obama admin has listened to your disad, and voted against using leverage for gold standard 123 agreements for fear of their internal link—proves if the disad link is true, Obama would reverse

Henry Sokolski, executive director of the Nonproliferation Policy Education Center, 2/7/12, Obama's Nuclear Mistake, www.nationalreview.com/blogs/print/290330

What prompted Obama to kick this political nest? A stunning inattention to nuclear-export realities, his own nuclear-control rhetoric, and history.

In 2008, President Bush negotiated a nuclear-cooperative agreement with the United Arab Emirates (UAE). This agreement featured two new and important nonproliferation conditions. The first required the UAE to forswear making nuclear fuel — a process that can bring states to the very brink of acquiring bombs. The second stipulated that the UAE must open its nuclear facilities to intrusive nuclear inspections authorized under a special international understanding known as the Additional Protocol. While it negotiated this agreement with the UAE, the Bush administration also peddled its new, tougher conditions to existing and prospective U.S. civilian-nuclear-technology recipients, including Jordan, Egypt, Indonesia, Saudi Arabia, and Vietnam.

Initially, this effort enjoyed President Obama’s support after he succeeded Bush: He put the final touches on the UAE deal and in 2009 sold it as the new nonproliferation “Gold Standard” for future civilian nuclear-cooperation deals. After a year’s effort trying to get Jordan, Vietnam, and South Korea to forswear making nuclear fuel, though, Team Obama started to go wobbly.

First, in the late summer of 2010, Secretary of State Hillary Clinton announced that the U.S. had initialed a nuclear deal with Vietnam that lacked the Gold Standard conditions. The Hill went nuts. Letters were sent to the secretary of state, and State quietly put the Vietnam agreement on ice while the National Security Council ordered an interagency policy review. Deputy Secretary of State James Steinberg, who wanted to uphold the standard, fought Deputy Secretary of Energy Daniel Poneman, who did not. Nothing was decided.

Then, in July of 2011, Steinberg left the government. In short order, Poneman prevailed over remaining resistance within State. Late last year, State resumed nuclear cooperation talks with Vietnam. Anxious to notify the Hill, as required by law, Undersecretary of State Eileen Tauscher and Deputy Secretary Poneman tried to arrange a private, classified briefing with the House and Senate foreign-affairs committee chairmen and ranking members. But all the important members were out of town. So instead, the two officials sent them a short note.

It was a knee-slapper. First, it said the administration had decided that pushing the Bush administration’s Gold Standard would actually risk undermining nuclear nonproliferation. “We are concerned,” Tauscher and Poneman argued, that pushing this standard would “reduce[ ] the number of future U.S. partners, minimizing our nonproliferation influence.”

Second, they noted that “France and Russia in particular are very aggressive in pursuing nuclear business,” that “neither imposes enrichment or reprocessing conditions in their agreements,” and that for every billion dollars of exports, the U.S. is able to support 10,000 jobs. So, if we want jobs, we have to back off pushing nuclear nonproliferation? That seems to be the letter’s conclusion. Yet it’s unclear if there are any significant U.S. reactor exports to be made, or any truly American vendors to make them. Nearly 80 percent of Westinghouse’s nuclear division is now Japanese- and Kazakhstani-owned; roughly half of General Electric’s is Japanese-owned. As for nuclear manufacturing, nearly all of that is now done overseas. Also, the Fukushima tsunami disaster has endangered whatever U.S. nuclear reactor or component exports might otherwise be left. Certainly prospective foreign customers have been loath to forswear suing U.S. nuclear firms in the case of a nuclear accident. Yet without such a pledge, U.S. vendors will not sell. The letter’s most egregious error, though, is its misreading of the nuclear market. Contrary to the two officials’ suggestion, the most profitable nuclear sales prospect is not overseas reactors, where profit margins can be negative. Instead, it’s supplying nuclear fuel to run the U.S.’s 104 power reactors, the world’s largest fleet. Russia and France are eager to penetrate this market. France is building a $4.8 billion fuel-fabrication plant in Georgia for the U.S. Department of Energy and has secured a $2 billion conditional federal loan guarantee to enrich uranium in Idaho. Russia would like to establish a similar U.S. enrichment project. Bottom line: If the U.S. wants to make a nuclear buck, doing so while maintaining nonproliferation standards depends far less on what other nuclear suppliers are doing overseas than those foreign suppliers’ export profits depend on securing U.S. taxpayer funds and loan guarantees.

So far, however, Team Obama has avoided exploiting this leverage. Impatient, the House Committee on Foreign Affairs has reported out a bill (H.R. 1280) to push the Gold Standard by increasing congressional oversight over U.S. civilian nuclear-cooperative agreements. The Senate has yet to act.

#### Plan can’t reverse negotiating positions

Lewis 12

Jeffrey Lewis, director of the East Asia Nonproliferation Program at the James Martin Center for Nonproliferation, 8/1/12, It's Not as Easy as 1-2-3, www.foreignpolicy.com/articles/2012/08/01/it\_s\_not\_as\_easy\_as\_1\_2\_3?page=full

The Obama administration largely finds itself an accidental architect of the new civil nuclear order. In addition to a new wave of countries seeking nuclear help from the United States, many 123 agreements that were negotiated 30 years ago -- during the last wave of enthusiasm for nuclear power -- will expire between **now and 2014**. When this flurry of activity ends, the United States will have negotiated more than a dozen nuclear cooperation agreements in a four-year period, many with the most important emerging nuclear powers. Dick Stratford, a senior State Department official, told a conference that he carried around a little list in his pocket because he had trouble keeping all the negotiations straight.

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

John P **Banks and** Charles K **Ebinger 11**, John is a fellow with the Energy Security Initiative at the Brookings Institution, Charles is senior fellow and director of the Energy Security Initiative at the Brookings Institution, “Introduction: Planning a Responsible Nuclear Future” in “Business and Nonproliferation”, googlebooks

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.

#### 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?"

#### 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.

#### SMRs eliminate incentive for ENR

Moniz Forsberg and Kazimi 10

MIT Study co-chaired by Ernest Moniz, Professor of Physics and Engeering Systems director MIT energy Initiative, Charles Forsberg, executive director MIT Fuel cycle Study department of nuclear Science and engineering, Mujid Kazimi, Tokyo electric Professor of nuclear engineering director, center for advanced nuclear energy Systems, department of nuclear Science and engineering department of Mechanical engineering, 2010, The Future of the Nuclear Fuel Cycle, http://web.mit.edu/mitei/docs/spotlights/nuclear-fuel-cycle.pdf

Nuclear weapons proliferation is a national security challenge and requires diplomatic and institutional solutions. As nations advance technologically, it becomes increasingly difficult to deny them the technology and materials to develop nuclear weapons if they are motivated by security interests to do so. Thus proliferation at its center is an institutional challenge. The civilian nuclear power fuel cycle is one of several routes to nuclear weapons materials; there- fore, strong incentives exist to adopt fuel cycle strategies that minimize the potential coupling of nuclear weapons and commercial nuclear fuel cycles. Hence, avoiding the creation of sepa- rated plutonium in future cycles would be an example of minimizing the potential coupling.

In the context of civilian fuel cycles and nonproliferation, the reactor is not the principal concern. The primary concerns are associated with uranium enrichment and/or reprocessing facilities—the front and backend fuel cycle facilities that would enable a nation to ac- quire weapon usable materials in a breakout scenario. **Establishment of enrichment and/ or reprocessing capability are not economic choices for small reactor programs;** however, guaranteed supplies of fuel are important to countries that embark on electricity production from nuclear energy. Waste management will be a significant challenge for some countries.

## immigration – india impact

US-Indian relations low but will never collapse

**Padukone 12** (Neil Padukone is the Felow for geopolitics at the Takshashila Institution, 6/19/2012, "Natural Allies?", pragati.nationalinterest.in/2012/06/natural-allies/)

In the late 1990s, the United States and India embarked on a partnership based largely on three strategic issues: markets, counter-terrorism, and balancing China. With the opening of India’s economy in 1991, the United States saw India’s billion-strong population as a massive market for its businesses. In the wake of 9/11, Washington came to see India’s travails against Islamist militants in Kashmir and Afghanistan through the lens of its War on Terror and increased counter-terrorism cooperation with New Delhi. And as India’s and China’s strategic spaces began to overlap, managing China’s rise became a common concern for both New Delhi and Washington. With that in mind, the United States and India reversed decades of enmity and, through the 2006 nuclear deal, embarked upon a symbolic commitment to what heads of state of both countries have called a “natural alliance.” Yet with all the fanfare- particularly after U.S. President Barack Obama voiced his support for a permanent Indian seat on the UN Security Council in his 2010 Lok Sabha speech- bilateral ties have recently been marked by considerable drift: India has not fallen in line on the issue of Iran, Washington is only slowly coming around on Pakistani militancy, the countries’ UN voting records do not mesh, and trade disagreements abound. Questions have been raised over why U.S.-India relations have cooled, or whether they were over hyped in the first place. The U.S. Department of Defense’s “strategic pivot” toward Asia is one way to shore up relations and realign the Indo-U.S. partnership. India’s geostrategic location at the centre of the Indian Ocean- along with its naval expansion toward the southern Indian Ocean and its Port Blair naval base at the Andaman Islands- enable New Delhi to manage China’s presence in the region. Indeed, India and America’s navies have been more coordinated than any other bureaucracy since 2000. But the implications of this shared Beijing-centric orientation will only come about in the medium-term. One dimension of these ties, the sale of defence technologies, is another place where India has not yet delivered: the recent Medium Multi-Role Combat Aircraft (MMRCA) competition failed to award contracts to American companies. And in the middle of a global recession in which all countries are hunkering down, and domestic inflation and unemployment- not to mention concerns over doing business in India, such as retroactive taxation and tax avoidance measures- have grown, economic reforms that would further open India’s markets have slowed. U.S. Secretary of State Hillary Clinton’s recent visit to Kolkata was largely an effort to encourage India to increase the speed of its market liberalisation, particularly in the retail sector. This may be a prospect for the future, but is doubtful today given India’s economic slowdown and the attendant drop in employment. Yet perhaps the main reason for this strategic drift is that America’s key concern in South Asia these days is Afghanistan. President Obama delivered on his campaign promise to refocus efforts on the war in that country, and from 2009, his administration’s “AfPak” strategy took a regional perspective that originally sought to bring India into the equation. The thinking behind this, as Amitai Etzioni writes, is that “for Pakistanis, conflict (with India) poses an ominous existential challenge that drives their behaviour on all things,” including “their approach to the West and the war in Afghanistan… If the India-Pakistan confrontation could be settled, chances for progress on other fronts would be greatly enhanced.” The implication was that Washington ought to hyphenate India and Pakistan, to see the two as part of the same regional tussle, and try to settle the Kashmir dispute in order to make progress in Afghanistan. This was something New Delhi vehemently opposed and in fact, it sought de-hyphenation from Pakistan – engagement with New Delhi and Islamabad on separate and unconnected tracks. So when the office of the late US Special Adviser on Pakistan and Afghanistan Richard Holbrooke sought to include India and Kashmir in its purview, New Delhi successfully lobbied against it. This effort served one of India’s aims, insofar as it keeps Kashmir out of America’s area of direct intervention. Yet it also takes India, its assets, and its clout out of the broader Afghan resolution. Among these assets is the Indian-constructed Chabahar Road that connects Iran’s eastern Chabahar Port on the Gulf of Oman to western Afghanistan. The road ends Pakistan’s monopoly on seaborne trade to Afghanistan, which has long allowed Islamabad’s pernicious dominance of Kabul’s economic and political life. In light of America’s confrontation with Iran and efforts to sanction the latter’s energy sector, however, Washington opposes India’s use of Chabahar, particularly to import Iranian oil and natural gas. Indeed another goal of Secretary Clinton’s visit was to try to shore up India’s support for sanctions against Iran- to which end India is reducing its dependence on Iranian energy as it awaits an exemption on sanctions from the US State Department. But when New Delhi recently used its Chabahar road to send 100,000 tons of wheat to Kabul, its full potential vis-à-vis Afghanistan became evident. And this food aid was on top of India’s additional commitments to Afghanistan: constructing the Zaranj-Delaram highway in western Afghanistan that connects Chabahar to the Afghan ring road, the development of the Ayni Air base in Tajikistan (originally designed to treat wounded Afghan soldiers), building Afghanistan’s parliament building, exploring the Hajigak iron mine, and even commitments to train the Afghan National Police and Army- all of which amount to pledges of over $1 billion since 2001. Washington has been wary of encouraging India’s presence in Afghanistan citing Islamabad’s fear of encirclement. But, even without American attention, a refutation of Pakistan’s “India Threat” narrative is already underway. In order to remain focused on strategic horizons beyond South Asia, India is reorienting its defence apparatus away from Pakistan and towards China and the southern Indian Ocean; even the Ayni Base and Chabahar Road can be seen as elements of this strategic shift beyond the subcontinent. Together with Pakistan’s focus on the Durand Line and events within its own borders, political breathing space between Islamabad and New Delhi has opened up. India-Pakistan talks have already produced a number of important breakthroughs that portend better bilateral days to come: the granting of Most-Favoured Nation status, enhanced trade measures, as well as discussions on the specific parameters of a Kashmir peace based on economic integration. Specifically regarding the Indo-Pak dynamic in Afghanistan, things are less zero-sum than they appear. Important as the Chabahar route is, the combination of road, sea, and even rail links still comes with massive transport costs for India-Afghanistan trade. As S Verma, chairman of Steel Authority of India and the head of a consortium of Indian industries engaged in Afghanistan’s Hajigak iron mine, put it, “over the longer term,” transporting Afghan minerals over Pakistani territory “will be a productive investment. Not just for us, but others in the region including Pakistan. There are license fees, logistics, and so forth.” Meanwhile, Kaustav Chakrabarti of the Observer Research Foundation has suggested “deploying joint Indo-Pak nation building teams” in Afghanistan that include advisors, military trainers, bureaucrats, developments experts, medical crews and NGOs. These teams would “provide additional resources, bridge political polarities, foster cooperation between India and Pakistan and devise means to verify each other’s role, and ultimately, present a long-term mechanism,” guaranteed by India and Pakistan’s geographic proximity, “to ensure Afghanistan’s neutrality.” He cites as a precedent the collaboration between Indian and Pakistani armed forces in “UN peacekeeping missions in hot spots like Somalia.” Full realisation of any Indo-Pak promise will require more space, and time, between the two countries. The interim period, meanwhile, may indeed take a cooling period between the United States and India, who are unlikely to become allies in the fullest sense due to differing tactical approaches. But the strategic fundamentals of the Indo-American rapport- balancing China, expanding trade, and stabilising South Asia- remain intact.

#### Visa’s not key to reverse brain drain

Wadhwa 9

Vivek Wadhwa, executive in residence/adjunct professor at the Pratt School of Engineering at Duke University and a senior research associate with the Labor and Worklife Program at Harvard Law School, Spring 2009, “A Reverse Brain Drain,” Issues in Science and Technology, <http://www.issues.org/25.3/wadhwa.html>

To our surprise, visa status was not the most important factor determining their decision to return home. Three of four indicated that considerations regarding their visa or residency permit status did not contribute to their decision to return to their home country. In fact, 27% of Indian respondents and 34% of Chinese held permanent resident status or were U.S. citizens. For this highly select group of returnees, career opportunities and quality-of-life concerns were the main reasons for returning home. Family considerations are also strong magnets pulling immigrants back to their home countries. The ability to better care for aging parents and the desire to be closer to friends and family were strong incentives for returning home. Indians in particular perceived the social situation in their home country to be significantly superior. The move home also appeared to be something of a career catalyst. Respondents reported that they have moved up the organization chart by returning home. Only 10% of the Indian returnees held senior management positions in the United States, but 44% found jobs at this level in India. Chinese returnees went from 9% in senior management in the United States to 36% in China. Opportunities for professional advancement were considered to be better at home than in the United States for 61% of Indians and 70% of Chinese. These groups also felt that opportunities to launch their own business were significantly better in their home countries.

## immigration

#### Obama losing immigration still results in high-skill reform

Matthew Yglesias, Slate, 1/15/13, How the GOP Can Roll Obama on Immigration, www.slate.com/blogs/moneybox/2013/01/15/immigration\_reform\_will\_obama\_get\_rolled.html

Of the major policy issues under discussion in Washington, "immigration reform" stands out for having unusually undefined content. For the major immigration-advocacy groups, the goal is clear, a comprehensive bill that includes a path to citizenship for the overwhelming majority of unauthorized migrants already living in the United States. But many other aspects of immigration law are in the mix as part of a proposed deal, and it seems to me that there's a fair chance that a nimble Republican Party could essentially roll the Democratic coalition and pass an "immigration reform" bill that doesn't offer the path Latino advocacy groups are looking for.

Elise Foley has the key line from her briefing on the administration's thinking about immigration, namely that a piecemeal approach "could result in passage of the less politically complicated pieces, such as an enforcement mechanism and high-skilled worker visas, while leaving out more contentious items such as a pathway to citizenship for undocumented immigrants."

And indeed it could. But how can they stop it? The last House GOP effort to split the high-tech visas question from the path to citizenship question was an absurd partisan ploy. If Republicans want to get serious about it they should be able to make it work. The centerpiece would be something on increased immigration of skilled workers. That's something the tech industry wants very much, it's a great idea on the merits, and few influential people have any real beef with it. High tech visas will easily generate revenue to pay for some stepped-up enforcement. Then instead of adding on a poison pill so Democrats will block the bill, you need to add a sweetener. Not the broad path to citizenship, but something small like the DREAM Act. Now you've got a package that falls massively short of what Latino groups are looking for, but that I think Democrats will have a hard time actually blocking. After all, why would they block it? It packages three things—more skilled immigration, more enforcement, and help for DREAMers—they say they want. Blocking it because it doesn't also do the broad amnesty that liberals want and conservatives hate would require the kind of fanaticism that is the exact opposite of Obama's approach to politics.

#### Gun control first—triggers the link, no matter the outcome

Jonathan Rauch, NY Daily News, 1/20/13, Tackle immigration first, Mr. President, www.nydailynews.com/opinion/tackle-immigration-mr-president-article-1.1242944?print

And so what should have been a historic policy achievement, and a political watershed for Republicans, never happened. Imagine how different Republicans might look to Hispanic voters today if a Republican President and Congress had led immigration reform. Bush probably still rues that misstep. And now President Obama looks set to repeat it. Once again, a reelected but polarizing President begins his second term with political stars aligned for immigration reform. Democrats need to do it, because their liberal and Hispanic base demands it. Republicans also need to do it, because they are desperate to shed their hard-won reputation for hostility to immigrants and Latinos. Obama needs to do it; he has been campaigning on it since 2008, when he said he would “move that forward as quickly as possible.” Not least important, the country sorely needs immigration reform. The current system has become not only a political thorn in the side of both parties but a drag on growth and innovation. Recent evidence shows that immigration, even low-skilled immigration, is a net economic and social plus. Meanwhile, the current federal policy takes too little account of skill and talent, and admits fewer workers than the economy needs for the jobs it actually has. America’s current policy is to educate the next foreign-born generation of engineers and entrepreneurs and then expel most of them. And the policy is inhumane as well as inefficient. Millions of otherwise law-abiding and productive people are driven underground, including many who would pay a reasonable fine or penalty to get right with the law; thousands of same-sex partners and spouses are vindictively shut out of the country. These are not problems over which Washington has merely indirect influence, as it does with most social problems. They are problems that Congress could actually solve. You say we should secure the borders before reforming immigration law? Though you would never know it from some of the political rhetoric, border control has been accomplished, at least as completely as it ever can be. As Edward Alden of the Council on Foreign Relations noted in a Cato Journal article last year, over the last two decades, the government has more than septupled the size of the border patrol, built nearly 700 miles of fencing along the Mexican border, and deployed technologies ranging from cameras to drones. “The U.S. borders are far harder to cross illegally than at any time in American history, and the number of people entering illegally has dropped sharply,” Alden writes. Border security is not perfect and never will be, but enough has been achieved so that even “security first” advocates should be willing to move on to legal reform. Immigration reform, then, offers the highest bang for the buck of any reform agenda now before Congress. For Democrats, it also offers to cement the electoral loyalty of the growing Hispanic population for decades to come. So what does Obama do first? Gun control. If ever there was a political sticky wicket, this is it. “Gun Agenda Faces an Uphill Battle,” headlined the Washington Post the other day. You can say that again. On the merits, in a magic-wand world, it makes sense to tighten some gun regulations, especially by closing the so-called “gun show loophole,” which allows non-dealers to buy firearms without background checks. But let’s not kid ourselves: In a country with perhaps 250 million firearms already in private hands, even the deftest regulatory improvements will bring only marginal reductions in violence. No one likes to hear this, but it is true: the mass murder at Sandy Hook Elementary School was an atrocity of the first magnitude, and even one such atrocity is too many — but mass shootings in schools are very rare, and way, way down the list of causes of violent deaths. Moreover, there is little the federal government can do to prevent them. No doubt, Obama was distraught by those murders. We all were. But this was a case when his more characteristic cold-blooded realism would have served him better. None of what makes immigration so urgent and accomplishable is true of gun control. There is no bipartisan desire to get it done. In fact, not even Democrats are united. Republicans already smell blood: a chance to grind Obama down by stalling and obstructing in the usual way and to re-energize what has been, until now, a demoralized conservative base. The National Rifle Association will provide plenty of assistance with that project, fattening its coffers along the way. Now, Obama is more popular today than Bush was in 2005, and he won a stronger reelection victory; nor is gun regulation as quixotic as was Bush’s effort to reform Social Security with only one party’s support. Obama may yet succeed where Bush failed. Suppose he does succeed, though. What with the upcoming two (or is it three? four?) budgetary crises, the bandwidth for immigration was always narrow. It will be narrowed still further by diverting legislative time and energy toward guns. Gun control gives liberals a new crusade, but in doing so it opens an attention-distracting, resource-depleting two-front war. Meanwhile, the window of opportunity for immigration might stay open for a while, but it might not, especially if Obama is weakened and conservatives regroup. And if he loses on guns? Bush thought he could afford to lose on Social Security and move on to immigration. He was wrong. In fact, he never recovered. His political strength and strategic credibility were shaken, and he spent the rest of his second term playing defense. Also, of course, the immigration-reform window closed. Republican moderates were marginalized by conservatives who had no interest in any reform that Democrats might accept. Unlike President Bill Clinton, Obama has never broken in any important way with his liberal base. Gun control, despite its poor return on investment as a policy matter, is catnip to liberals. They just can’t stay away from it. That might be all right if the opportunity cost weren’t so high — for Democrats and liberals, for the economy, and not least for immigrants. One thing I have learned about Barack Obama: When he and I disagree, he is usually right and I am usually wrong. Maybe he sees something I don’t. Maybe it is true, as liberals seem to believe, that public opinion on guns has undergone a fundamental change (though more likely, based on the available facts, is that the public is undergoing a short-term reaction to a prominent news story). As a supporter of both immigration reform and smarter gun regulation, I hope Obama, unlike Bush at the same point eight years ago, gets away with his off-center lurch. If not, in a few years senior administration officials will be scratching their heads, wondering why the heck they didn’t put immigration first.

#### Pol cap isn’t key–Obama is letting congress work out the details

Elise Foley, staff writer, 1/15/13 [“Obama Gears Up For Immigration Reform Push In Second Term,” HuffPost, http://www.huffingtonpost.com/2013/01/15/obama-immigration-reform\_n\_2463388.html]

In a briefing with The Huffington Post, a senior administration official said the White House believes it has met enforcement goals and must now move to a comprehensive solution. The administration is highly skeptical of claims from Republicans that immigration reform can or should be done in a piecemeal fashion. Going down that road, the White House worries, could result in passage of the less politically complicated pieces, such as an enforcement mechanism and high-skilled worker visas, while leaving out more contentious items such as a pathway to citizenship for undocumented immigrants.¶ "Enforcement is certainly part of the picture," the official said. "But if you go back and look at the 2006 and 2007 bills, if you go back and look at John McCain's 10-point 'This is what I've got to get done before I'm prepared to talk about immigration,' and then you look at what we're actually doing, it's like 'check, check, check.' We're there. The border is as secure as it's been in a generation or two, so it's really time."¶ One key in the second term, advocates say, will be convincing skeptics such as Republican Sen. John Cornyn of Texas that the Obama administration held up its end of the bargain by proving a commitment to enforcement. The White House also needs to convince GOP lawmakers that there's support from their constituents for immigration reform, which could be aided by conservative evangelical leaders and members of the business community who are pushing for a bill.¶ Immigrant advocates want more targeted deportations that focus on criminals, while opponents of comprehensive immigration reform say there's too little enforcement and not enough assurances that reform wouldn't be followed by another wave of unauthorized immigration. The Obama administration has made some progress on both fronts, but some advocates worry that the president hasn't done enough to emphasize it. The latest deportation figures were released in the ultimate Friday news dump: mid-afternoon Friday on Dec. 21, a prime travel time four days before Christmas.¶ Last week, the enforcement-is-working argument was bolstered by a report from the nonpartisan Migration Policy Institute, which found that the government is pouring more money into its immigration agencies than the other federal law-enforcement efforts combined. There are some clear metrics to point to on the border in particular, and Doris Meissner, an author of the report and a former commissioner of the U.S. Immigration and Naturalization Service, said she hopes putting out more information can add to the immigration debate.¶ "I've been surprised, frankly, that the administration hasn't done more to lay out its record," she said, adding the administration has kept many of its metrics under wraps.¶ There are already lawmakers working on a broad agreement. Eight senators, coined the gang of eight, are working on a bipartisan immigration bill. It's still in its early stages, but nonmembers of the "gang," such as Sen. Marco Rubio (R-Fla.) are also talking about reform.¶ It's still unclear what exact role the president will play, but sources say he does plan to lead on the issue. Rep. Zoe Lofgren (D-Calif.), the top Democrat on the House immigration subcommittee, said **the White House seems sensitive to the fact that Republicans and Democrats need to work out the issue in Congress -- no one is expecting a fiscal cliff-style arrangement jammed by leadership** -- while keeping the president heavily involved.¶ In other words, **it's not the place for steamrolling**. "He needs to be an honest broker here," said Ali Noorani, executive director of the National Immigration Forum, which works on bipartisan consensus for reform. "Instead of the politician forcing immigration reform, Obama needs to be the statesman creating immigration reform."¶ Beyond the border, Obama will push for changes to the legal immigration system, which is universally considered to be out of date and ill-suited to the labor market and to managing the future flow of immigrant workers. Any bill will almost certainly include an increase in visas for graduates with advanced degrees in science, technology, engineering or math, and more and better flexibility for foreign migrant labor.

#### GOP blocks AND lack of any immigration proposal discredits neg uniqueness

Mike Lillis, The Hill, 1/25/13, Republicans shift gears on immigration ahead of reform debate with Obama, thehill.com/homenews/house/279221-gop-girds-for-immigration-debate-with-obama

Not everyone sees the new GOP power structure as an indication that broad reforms might be forthcoming. Rosemary Jenks, director of government relations at NumbersUSA, which advocates for tougher immigration laws, characterized Goodlatte as a "very solid, pro-enforcement" voice who picked "very solid, pro-enforcement" lawmakers to represent his Immigration subcommittee. "There's not a chance the House will introduce or move a comprehensive bill," Jenks said Thursday in a phone interview. "Congress has tried comprehensive reform. It didn't work in 2007. It's not going to work this time around." All the moving pieces have left some observers with more questions about the coming debate than answers. A House Democratic aide who follows the issue said lawmakers are largely waiting to see what the White House proposes. Adding to the uncertainty, Gowdy and some of the other players are still very new to the debate, the aide said. "A lot of Republicans in the House who'll be working on this issue have never worked on it before," the aide said Thursday. "There's a lot of inexperience."

#### Forcing controversial fights key to Obama’s agenda—the alt is gridlock

John Dickerson, Slate, 1/18/13, Go for the Throat!, www.slate.com/articles/news\_and\_politics/politics/2013/01/barack\_obama\_s\_second\_inaugural\_address\_the\_president\_should\_declare\_war.single.html

On Monday, President Obama will preside over the grand reopening of his administration. It would be altogether fitting if he stepped to the microphone, looked down the mall, and let out a sigh: so many people expecting so much from a government that appears capable of so little. A second inaugural suggests new beginnings, but this one is being bookended by dead-end debates. Gridlock over the fiscal cliff preceded it and gridlock over the debt limit, sequester, and budget will follow. After the election, the same people are in power in all the branches of government and they don't get along. There's no indication that the president's clashes with House Republicans will end soon. Inaugural speeches are supposed to be huge and stirring. Presidents haul our heroes onstage, from George Washington to Martin Luther King Jr. George W. Bush brought the Liberty Bell. They use history to make greatness and achievements seem like something you can just take down from the shelf. Americans are not stuck in the rut of the day. But this might be too much for Obama’s second inaugural address: After the last four years, how do you call the nation and its elected representatives to common action while standing on the steps of a building where collective action goes to die? That bipartisan bag of tricks has been tried and it didn’t work. People don’t believe it. Congress' approval rating is 14 percent, the lowest in history. In a December Gallup poll, 77 percent of those asked said the way Washington works is doing “serious harm” to the country. The challenge for President Obama’s speech is the challenge of his second term: how to be great when the environment stinks. Enhancing the president’s legacy requires something more than simply the clever application of predictable stratagems. Washington’s partisan rancor, the size of the problems facing government, and the limited amount of time before Obama is a lame duck all point to a single conclusion: The president who came into office speaking in lofty terms about bipartisanship and cooperation can only cement his legacy if he destroys the GOP. If he wants to transform American politics, he must go for the throat. President Obama could, of course, resign himself to tending to the achievements of his first term. He'd make sure health care reform is implemented, nurse the economy back to health, and put the military on a new footing after two wars. But he's more ambitious than that. He ran for president as a one-term senator with no executive experience. In his first term, he pushed for the biggest overhaul of health care possible because, as he told his aides, he wanted to make history. He may already have made it. There's no question that he is already a president of consequence. But there's no sign he's content to ride out the second half of the game in the Barcalounger. He is approaching gun control, climate change, and immigration with wide and excited eyes. He's not going for caretaker. How should the president proceed then, if he wants to be bold? The Barack Obama of the first administration might have approached the task by finding some Republicans to deal with and then start agreeing to some of their demands in hope that he would win some of their votes. It's the traditional approach. Perhaps he could add a good deal more schmoozing with lawmakers, too. That's the old way. He has abandoned that. He doesn't think it will work and he doesn't have the time. As Obama explained in his last press conference, he thinks the Republicans are dead set on opposing him. They cannot be unchained by schmoozing. Even if Obama were wrong about Republican intransigence, other constraints will limit the chance for cooperation. Republican lawmakers worried about primary challenges in 2014 are not going to be willing partners. He probably has at most 18 months before people start dropping the lame-duck label in close proximity to his name. Obama’s only remaining option is to pulverize. Whether he succeeds in passing legislation or not, given his ambitions, his goal should be to delegitimize his opponents. Through a series of clarifying fights over controversial issues, he can force Republicans to either side with their coalition's most extreme elements or cause a rift in the party that will leave it, at least temporarily, in disarray.

#### SMRs are popular

Nelson and Northey ‘12

Gabriel and Northey, energy and environment reports for Greenwire, “DOE funding for small reactors languishes as parties clash on debt,” <http://www.eenews.net/public/Greenwire/2012/09/24/3>, AM

It's not just wind and solar projects that are waiting for federal help as Congress duels over the importance of putting taxpayer dollars on the line for cutting-edge energy projects. Some of the nation's largest nuclear power companies are anxious to hear whether they will get a share of a $452 million pot from the Department of Energy for a new breed of reactors that the industry has labeled as a way to lessen the safety risks and construction costs of new nuclear power plants. The grant program for these "small modular reactors," which was announced in January, would mark the official start of a major U.S. foray into the technology even as rising construction costs -- especially when compared to natural-gas-burning plants -- cause many power companies to shy away from nuclear plants. DOE received four bids before the May 21 deadline from veteran reactor designers Westinghouse Electric Co. and Babcock & Wilcox Co., as well as relative newcomers Holtec International Inc. and NuScale Power LLC. Now the summer has ended with no announcement from DOE, even though the agency said it would name the winners two months ago. As the self-imposed deadline passed, companies started hearing murmurs that a decision could come in September, or perhaps at the end of the year. To observers within the industry, it seems that election-year calculations may have sidelined the contest. "The rumors are a'flying," said Paul Genoa, director of policy development at the Nuclear Energy Institute, in an interview last week. "All we can imagine is that this is now caught up in politics, and the campaign has to decide whether these things are good for them to announce, and how." Small modular reactors do not seem to be lacking in political support. The nuclear lobby has historically courted both Democrats and Republicans and still sees itself as being in a strong position with key appropriators on both sides of the aisle. Likewise, top energy officials in the Obama administration have hailed the promise of the new reactors, and they haven't shown any signs of a change of heart. DOE spokeswoman Jen Stutsman said last week that the department is still reviewing applications, but she did not say when a decision will be made.

## at: webb

#### Financial incentives includes creating a market—this is the govt as well

EIA 1 (Renewable Energy 2000: Issues and Trends, Report prepared by the US Energy Information Administration, “Incentives, Mandates, and Government Programs for Promoting Renewable Energy”, http://tonto.eia.doe.gov/ftproot/renewables/06282000.pdf)

Over the years, incentives and mandates for renewable energy have been used to advance different energy policies, such as ensuring energy security or promoting environmentally benign energy sources. Renewable energy has beneficial attributes, such as low emissions and replenishable energy supply, that are not fully reflected in the market price. Accordingly, governments have used a variety of programs to promote renewable energy resources, technologies, and renewable-based transportation fuels.1 This paper discusses: (1) financial incentives and regulatory mandates used by Federal and State governments and Federal research and develop- ment (R&D),2, 3 and (2) their effectiveness in promoting renewables.

A financial incentive is defined in this report as providing one or more of the following benefits:

• A **transfer of economic resources** by the Government to the buyer or seller of a good or service that has the effect of reducing the price paid, or, increasing the price received, respectively;

 • Reducing the cost of production of the good or service; or,

 • **Creating or expanding a market for producers**.

The intended effect of a financial incentive is to increase the production or consumption of the good or service over what it otherwise would have been without the incentive. Examples of financial incentives are: tax credits, production payments, trust funds, and low-cost loans. Research and development is included as a support program because its effect is to decrease cost, thus enhancing the commercial viability of the good(s) provided.4

Regulatory mandates include both actions required by legislation and regulatory agencies (Federal or State). Examples of regulatory mandates are: requiring utilities to purchase power from nonutilities and requiring the incorporation of environmental impacts and other social costs in energy planning (full cost pricing). Another example is a requirement for a minimum percentage of generation from renewable energy sources (viz., a “renewable portfolio standard,” or, RPS). Regulatory mandates and financial incentives can produce similar results, but regulatory mandates generally require no expenditures or loss of revenue by the Government.

## cards

#### From the govt

Doris 12 – National Renewable Energy Laboratory (Elizabeth, “Policy Building Blocks: Helping Policymakers Determine Policy Staging for the Development of Distributed PV Markets,” Paper to be presented at the 2012 World Renewable Energy Forum, 5/13-5/17, http://www.nrel.gov/docs/fy12osti/54801.pdf)

3.3 Market Expansion

This stage of policy development targets the development of projects and includes both incentives that attempt to distribute the high first costs of distributed technologies and policies that facilitate project installation. The purpose of this category is to increase the installation of individual projects through monetizing the non-economic benefits of distributed generation for the developer. Because the value of those benefits vary in different contexts, these policies can be politically challenging to put in place and technically challenging to design and implement. There is a large body of literature (encompassing the energy field as well as other fields) that discusses the design and implementation of effective market incentives. Specific policy types include:

• Incentives. In the context of this framework, incentives are defined as **direct monetary support** for specific project development. Incentives, especially in the current economic environment, can be politically challenging to implement and require detailed design to ensure that they are effectively reaching the intended market at levels that spur development without creating over-subsidization. Because of the complications and expense of these types of policies, they are most used and most cost-effective in environments where the market is prepared for project development. There are three primary types of incentives:

• **Investment incentives directly alter the first cost of technologies**. These incentives can take the form of grants, rebates, or tax incentives, depending on the market needs. Grants are typically applied to larger scale projects and are paid in advance of development, and so target development that would not take place without advance investment. Rebates are most commonly based on equipment purchases and can be applied at the time of purchase or through a post-purchase mechanism. Tax incentives can be deductions or credits, can be applied to entire installations, and are applied after purchase, annually. Tax incentives target development that does not need direct capital investment, but instead prioritizes reduction in pay-back period.

• **Production incentives provide payment for electricity produced** from the distributed electricity. These are different from net metering because the aim is not to provide the economic value of electricity sold into the grid, but instead, to monetize the indirect benefits of distributed generation and apply that on a production basis to projects. These incentives do not directly remove the challenge of higher first costs, and so are most effective in situations in which those high first costs can be spread over the course of the project lifetime (e.g., where direct priori investment is not a priority). In the last decade, incentives for distributed generation have tended toward the production type, because it assures the public that the investment is resulting in clean energy development (whereas investment incentives have the potential to be invested in projects that do not materialize).

• **Feed-in-Tariffs**. This incentive type reduces investment risk by **providing fixed payments for projects** based on the levelized cost of renewable energy generation. This (among other design characteristics) distinguishes feed-in-tariffs from production-based incentives, which are based on monetizing the value of the electricity to the grid or the value to the electricity purchaser.

• Removing Siting Restrictions or Ensuring Broad Market Access. Siting restrictions can be stipulated by local ordinances or home owners associations and designate where solar panels can be placed within the jurisdiction. Twenty-four states currently have laws in place that prevent the restriction of solar facilities on residences (12). Like the current state role in encouraging transparency in permitting policies, these typically legislative policies cost nothing to put in place, but implementation and enforcement can be challenging and costly, depending on the interests of the localities. This is an expansion policy (as opposed to a preparation policy) because the effect of siting restrictions is currently unclear, and to date, market development has not been limited by these types of regulations.

• Streamlined Permitting. Permitting for solar facilities has traditionally been the jurisdiction of localities, but there are some states that also issue permits. In the past two years, both Colorado (13) and Vermont (14) have issued laws regulating state permits for renewable energy systems. Such permitting falls into the market expansion category as a potential follow-on to the development of transparent permitting. However, because of its limited use to date there is little information on effectiveness, potential intended or unintended impacts, or broad applicability, so it is not currently considered a primary policy for developing markets.

#### It’s a financial incentive

Diehl 7 – Junior Staff Member, Journal of Land, Resources & Environmental Law; J.D candidate (Rustin P., “NOTE: Transitioning to a Clean Renewable Energy Network in the West”, 27 J. Land Resources & Envtl. L. 345, Lexis Law)

Many studies have considered the benefits and achieved results of the available renewable energy financial incentives. While studies agree that these incentives are effectively promoting business integration of renewable energies, it is questionable whether the incentives encourage private adoption of renewable energy technology.n55 The incentives for implementing clean renewable power generation fall into two main categories: financial incentives and policy  [\*354]  incentives. These incentives can be provided at federal, state, and municipal levels.

A laundry list of financial incentives include: corporate equipment rebates, energy efficient mortgages, accelerated corporate depreciation schedules, corporate tax credits, corporate production incentives, corporate and personal tax exemptions, personal tax credits, federal grant programs, USDA renewable energy systems and energy efficiency improvements loan programs, green power purchasing or aggregation, corporate tax incentive, industry recruitment incentives, property tax incentives, state public benefit funds, and state sales tax incentives. n56

Some of the policy incentives encouraging the use of renewable energies include: construction and design policies, contractor licensing, equipment certifications, generation disclosure rules, net metering rules, renewables portfolio set asides, required utility green power option, and solar and wind access laws. n57 In addition to these policy incentives, many states have adopted portfolio mandates or portfolio standards, which require certain percentages of energy come from renewable sources.n58

## AT: Russia – US War

No escalation – disagreements remain limited

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.

No nuclear strike

Graham 7 (Thomas Graham, senior advisor on Russia in the US National Security Council staff 2002-2007, 2007, "Russia in Global Affairs” The Dialectics of Strength and Weakness http://eng.globalaffairs.ru/numbers/20/1129.html)

An astute historian of Russia, Martin Malia, wrote several years ago that “Russia has at different times been demonized or divinized by Western opinion less because of her real role in Europe than because of the fears and frustrations, or hopes and aspirations, generated within European society by its own domestic problems.” Such is the case today. To be sure, mounting Western concerns about Russia are a consequence of Russian policies that appear to undermine Western interests, but they are also a reflection of declining confidence in our own abilities and the efficacy of our own policies. Ironically, this growing fear and distrust of Russia come at a time when Russia is arguably less threatening to the West, and the United States in particular, than it has been at any time since the end of the Second World War. Russia does not champion a totalitarian ideology intent on our destruction, its military poses no threat to sweep across Europe, its economic growth depends on constructive commercial relations with Europe, and its strategic arsenal – while still capable of annihilating the United States – is under more reliable control than it has been in the past fifteen years and the threat of a strategic strike approaches zero probability. Political gridlock in key Western countries, however, precludes the creativity, risk-taking, and subtlety needed to advance our interests on issues over which we are at odds with Russia while laying the basis for more constructive long-term relations with Russia.

No accidents or miscalculation

Ball 6 (Desmond, Special Professor at the Strategic and Defence Studies Centre at the Australian National University, “The Probabilities of ‘On the Beach,’” May, rspas.anu.edu.au/papers/sdsc/wp/wp\_sdsc\_401.pdf)

The prospects of a nuclear war between the United States and Russia must now be deemed fairly remote. There are now no geostrategic issues that warrant nuclear competition and no inclination in either Washington or Moscow to provoke such issues. US and Russian strategic forces have been taken off day-to-day alert and their ICBMs ‘de-targeted’, greatly reducing the possibilities of war by accident, inadvertence or miscalculation. On the other hand, while the US-Russia strategic competition is in abeyance, there are several aspects of current US nuclear weapons policy which are profoundly disturbing. In December 2001 President George W. Bush officially announced that the United States was withdrawing from the Anti-Ballistic Missile (ABM) Treaty of 1972, one of the mainstays of strategic nuclear arms control during the Cold War, with effect from June 2002, and was proceeding to develop and deploy an extensive range of both theatre missile defence and national missile defence (NMD) systems. The first anti-missile missile in the NMD system, designed initially to defend against limited missile attacks from China and North Korea, was installed at Fort Greely in Alaska in July 2004. The initial system, consisting of sixteen interceptor missiles at Fort Greely and four at Vandenberg Air Force in California, is expected to be operational by the end of 2005. The Bush Administration is also considering withdrawal from the Comprehensive Test Ban Treaty and resuming nuclear testing. (The last US nuclear test was on 23 September 1992). In particular, some key Administration officials believe that testing is necessary to develop a ‘new generation’ of nuclear weapons, including low-yield, ‘bunker-busting’, earth-penetrating weapons specifically designed to destroy very hard and deeply buried targets (such as underground command and control centres and leadership bunkers).

## too expensive

#### High costs will prevent the switch to thorium

Niller 12

(Eric, “Alternative nuclear fuel energizes its proponents” February 21, 2012, Washington Post, Health; Pg. E01)

Although the idea of thorium power has been around for decades - and some countries are planning to build thorium-powered plants - it has not caught on with the companies that design and build nuclear plants in the United States or with the national research labs charged with investigating future energy sources. "There are small boatloads of fanatics on thorium that don't see the downsides," said Dan Ingersoll, senior project manager for nuclear technology at the Oak Ridge National Laboratory in Tennessee. For one thing, he said, it would be too expensive to replace or convert the nuclear power plants already running in this country: "A thorium-based fuel cycle has some advantages, but it's not compelling for infrastructure and investments." He also pointed out that thorium would still have some radioactive byproducts - just not as much as uranium and not as long-lived - and that there is no ready stockpile of thorium in the United States. It would have to be mined. Overall, he says the benefits don't outweigh the huge costs of switching technologies. "I'm looking for something compelling enough to trash billions of dollars of infrastructure that we have already and I don't see that."

#### Customer pressure deters utilities

Eric **Niiler 12**, Washington Post, “Nuclear power entrepreneurs push thorium as a fuel”, February 20, http://www.washingtonpost.com/national/health-science/nuclear-power-entrepreneurs-push-thorium-as-a-fuel/2011/12/15/gIQALTinPR\_story.html

But most U.S. nuclear energy industry executives are wary of both approaches to thorium, saying that neither utilities nor investors are eager to gamble on an unfamiliar technology. “Customers are telling us, ‘Let’s focus on taking [financial] risk off the table, not putting it back on,’ ” said Chris Mowry, president and chief executive of Babcock & Wilcox, a Lynchburg-based firm that is building smaller reactors fueled by uranium. “We view [thorium] as something that’s down the road. It’s more of the science-project phase.”

#### Can’t contain the fuel

Richard **Martin 9**, contributing editor for Wired and editorial director for Pike Research, “Uranium Is So Last Century — Enter Thorium, the New Green Nuke”, December 21, <http://www.wired.com/magazine/2009/12/ff_new_nukes/2/>

Critics point out that thorium’s biggest advantage — its high efficiency — actually presents challenges. Since the reaction is sustained for a very long time, the fuel needs special containers that are extremely durable and can stand up to corrosive salts. The combination of certain kinds of corrosion-resistant alloys and graphite could meet these requirements. But such a system has yet to be proven over decades.

#### It's too costly - India proves

#### Lovins 09

Amory B. Lovins, the co-founder, chairman and chief scientist of Rocky Mountain Institute, Nuclear Monitor, June 26, 2009, "“NEW” NUCLEAR REACTORS: SAME OLD STORY", http://www.nirs.org/factsheets/lovinsonifretc.pdf

Thorium reactors Some enthusiasts prefer fueling reactors with thorium--an element 3 times as abundant as uranium but even more uneconomic to use. India has for decades failed to commercialize breeder reactors to exploit its thorium deposits. But thorium can’t fuel a reactor by itself: rather, a uranium- or plutonium fueled reactor can convert thorium-232 into fissionable (and plutonium-like, highly bomb-usable) uranium-233. Thorium’s proliferation, waste, safety, and cost problems differ only in detail from uranium’s: e.g., thorium ore makes less mill waste, but highly radioactive U-232 makes fabricating or reprocessing U-233 fuel hard and costly. And with uranium-based nuclear power continuing its decades-long economic collapse, it’s awfully late to be thinking of developing a whole new fuel cycle whose problems differ only in detail from current versions.