### Case

#### Cyberterror coming against the grid now – we already know that they’ve been able to infiltrate the system

CNN 10-13 [Pam Benson – “Panetta: Cyber threat is pre 9/11 moment”, October 13th, 2012, http://security.blogs.cnn.com/2012/10/12/panetta-cyber-threat-is-pre-911-moment/?hpt=hp\_t3, Chetan]

The United States must beef up its cyber defenses or suffer as it did on September 11, 2001 for failing to see the warning signs ahead of that devastating terrorist attack, the Secretary of Defense told a group of business leaders in New York Thursday night. Calling it a “pre-9/11 moment,” Leon Panetta said he is particularly worried about a significant escalation of attacks. In a speech aboard a decommissioned aircraft carrier, Panetta reminded the Business Executives for National Security about recent distributed denial of service attacks that hit a number of large U.S. financial institutions with unprecedented speed, disrupting services to customers. And he pointed to a cyber virus known as Shamoon which infected the computers of major energy firms in Saudi Arabia and Qatar this past summer. More than 30-thousand computers were rendered useless by the attack on the Saudi state oil company ARAMCO. A similar incident occurred with Ras Gas of Qatar. Panetta said the attacks were probably the most devastating to ever hit the private sector. The secretary did not say who is believed responsible for those attacks, but senior defense officials who briefed reporters on the speech, said the United States knows, however they would not divulge the suspect. And he warned America's critical infrastructure - its electrical power grid, water plants and transportation systems - are threatened by foreign actors. "We know of specific instances where intruders have successfully gained access to these control systems," Panetta said. "We also know they are seeking to create advanced tools to attack those systems and cause panic, destruction and even loss of life."

#### Back ups don’t solve

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

DoD has traditionally assumed that the commercial grid will be subject only to infrequent, weather-related, and short-term disruptions, and that available backup power is sufficient to meet critical mission needs. As noted in the February 2008 Report of the Defense Science Board Task Force on DoD Energy Strategy, “In most cases, neither the grid nor on-base backup power provides sufficient reliability to ensure continuity of critical national priority functions and oversight of strategic missions in the face of a long term (several months) outage.”

#### Other states model US nuclear power policies

**Lewis, 12** – Director of the East Asia Nonproliferation Program at the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies (Jeffrey, 8/1. “It's Not as Easy as 1-2-3.” http://www.foreignpolicy.com/articles/2012/08/01/it\_s\_not\_as\_easy\_as\_1\_2\_3?page=0,1)

Creating market incentives to discourage the spread of enrichment and reprocessing seems like a reasonable thing to do -- except that most states make nuclear decisions on something other than a cost basis. Nuclear power enthusiasts have been no strangers to wishful thinking, starting with claims that nuclear energy would be "too cheap to meter." Government decisions about nuclear power tend to prioritize concerns about sovereignty and keeping technological pace with neighbors. It is not hard to see national nuclear programs as something akin to national airlines -- money-losing prestige projects that barely take market forces into account. Often, aspiring nuclear states look to countries like the United States and Japan as models. If such countries invest heavily in fuel-cycle services, developing states might try to copy them rather than simply become their customers. That's why others in the nonproliferation communityhave argued that the United States should use its desirability as a partner in nuclear cooperation as leverage. States are unlikely to forgo ENR programs simply because the United States or others offer cheap alternatives. A little muscle is called for -- and circumstances have offered leverage: With more than a dozen new agreements to be negotiated, the Obama administration has an opportunity to write into many agreements a new, stronger nonproliferation standard.

#### Warming is not inevitable – taking action now can lessen the impact

**Washington et al 9** [Warren M. Washington, 1 Reto Knutti, 2 Gerald A. Meehl, 1 Haiyan Teng, 1 Claudia Tebaldi, 3 David Lawrence, 1 Lawrence Buja, 1 and Warren G. Strand - National Center for Atmospheric Research, Boulder, Colorado, USA. and Institute for Atmospheric and Climate Science, ETH, Zurich, Switzerland. “How much climate change can be avoided by mitigation?”, GEOPHYSICAL RESEARCH LETTERS, VOL. 36, L08703, doi:10.1029/2008GL037074, 2009, Chetan]

**Avoiding the most serious climate change impacts will require informed policy decisions**. **This in turn will require information regarding the reduction of greenhouse gas emissions required to stabilize climate** in a state not too much warmer than today. **A new low emission scenario is simulated in a global climate model to show how some of the impacts from climate change can be averted through mitigation**. **Compared to a non-intervention reference scenario, emission reductions** of about 70% by 2100 are required to **prevent roughly half the change in temperature and precipitation that would otherwise occur.** By 2100, **the resulting stabilized global climate would ensure preservation of considerable Arctic sea ice and permafrost areas. Future heat waves would be 55% less intense, and sea level rise from thermal expansion would be about 57% lower than if a non-mitigation scenario was followed**

#### Warming is still reversible – consensus of scientists proves

Chestney 12 (Nina, “Global warming close to becoming irreversible-scientists”, 3/26, <http://www.reuters.com/article/2012/03/26/us-climate-thresholds-idUSBRE82P0UJ20120326>)

The world is close to reaching tipping points that will make it irreversibly hotter, making this decade critical in efforts to contain global warming, scientists warned on Monday. Scientific estimates differ but the world's temperature looks set to rise by six degrees Celsius by 2100 if greenhouse gas emissions are allowed to rise uncontrollably. As emissions grow, scientists say the world is close to reaching thresholds beyond which the effects on the global climate will be irreversible, such as the melting of polar ice sheets and loss of rainforests. "This is the critical decade. If we don't get the curves turned around this decade we will cross those lines," said Will Steffen, executive director of the Australian National University's climate change institute, speaking at a conference in London. Despite this sense of urgency, a new global climate treaty forcing the world's biggest polluters, such as the United States and China, to curb emissions will only be agreed on by 2015 - to enter into force in 2020. "We are on the cusp of some big changes," said Steffen. "We can ... cap temperature rise at two degrees, or cross the threshold beyond which the system shifts to a much hotter state." TIPPING POINTS For ice sheets - huge refrigerators that slow down the warming of the planet - the tipping point has probably already been passed, Steffen said. The West Antarctic ice sheet has shrunk over the last decade and the Greenland ice sheet has lost around 200 cubic km (48 cubic miles) a year since the 1990s. Most climate estimates agree the Amazon rainforest will get drier as the planet warms. Mass tree deaths caused by drought have raised fears it is on the verge of a tipping point, when it will stop absorbing emissions and add to them instead. Around 1.6 billion tonnes of carbon were lost in 2005 from the rainforest and 2.2 billion tonnes in 2010, which has undone about 10 years of carbon sink activity, Steffen said. One of the most worrying and unknown thresholds is the Siberian permafrost, which stores frozen carbon in the soil away from the atmosphere. "There is about 1,600 billion tonnes of carbon there - about twice the amount in the atmosphere today - and the northern high latitudes are experiencing the most severe temperature change of any part of the planet," he said. In a worst case scenario, 30 to 63 billion tonnes of carbon a year could be released by 2040, rising to 232 to 380 billion tonnes by 2100. This compares to around 10 billion tonnes of CO2 released by fossil fuel use each year. Increased CO2 in the atmosphere has also turned oceans more acidic as they absorb it. In the past 200 years, ocean acidification has happened at a speed not seen for around 60 million years, said Carol Turley at Plymouth Marine Laboratory. This threatens coral reef development and could lead to the extinction of some species within decades, as well as to an increase in the number of predators. As leading scientists, policy-makers and environment groups gathered at the "Planet Under Pressure" conference in London, opinions differed on what action to take this decade. London School of Economics professor Anthony Giddens favours focusing on the fossil fuel industry, seeing as renewables only make up 1 percent of the global energy mix. "We have enormous inertia within the world economy and should make much more effort to close down coal-fired power stations," he said. Oil giant Royal Dutch Shell favours working on technologies leading to negative emissions in the long run, like carbon capture on biomass and in land use, said Jeremy Bentham, the firm's vice president of global business environment.

### 2AC – Neo Lib

#### We aren’t neoliberal – countries are looking to transition to clean energy but they’re looking to the NRC to model SMR technology, we don’t FORCE anyone to adopt nuclear but allow the countries that do want it to adopt nuclear tech, their link ev is about things like cap and trade

#### Capitalism is inevitable

**Wilson 1** [John K. Wilson, best-selling progressive author and coordinator of the Independent Press Association’s Campus Journalism Project, 200 How the Left Can Win Arguments and Influence People: A Tactical Manual for Pragmatic Progressives, Published by NYU Press, ISBN 0814793630, p. 15-16]

Capitalism is far too ingrained in American life to eliminate. If you go into the most impoverished areas of America, you will find that the people who live there are not seeking government control over factories or even more social welfare programs; they're hoping, usually in vain, for a fair chance to share in the capitalist wealth. The poor do not pray for socialism—they strive to be a part of the capitalist system. They want jobs, they want to start businesses, and they want to make money and be successful. What's wrong with America is not capitalism as a system but capitalism as a religion. We worship the accumulation of wealth and treat the horrible inequality between rich and poor as if it were an act of God. Worst of all, we allow the government to exacerbate the financial divide by favoring the wealthy: go anywhere in America, and compare a rich suburb with a poor town—the city services, schools, parks, and practically everything else will be better financed in the place populated by rich people. The aim is not to overthrow capitalism but to overhaul it. Give it a social-justice tune-up, make it more efficient, get the economic engine to hit on all cylinders for everybody, and stop putting out so many environmentally hazardous substances. To some people, this goal means selling out leftist ideals for the sake of capitalism. But the right thrives on having an [end page 15] ineffective opposition. The Revolutionary Communist Party helps stabilize the "free market" capitalist system by making it seem as if the only alternative to free-market capitalism is a return to Stalinism. Prospective activists for change are instead channeled into pointless discussions about the revolutionary potential of the proletariat. Instead of working to persuade people to accept progressive ideas, the far left talks to itself (which may be a blessing, given the way it communicates) and tries to sell copies of the *Socialist Worker* to an uninterested public.

#### Condo is a voter- results in argument irresponsibility, time and strat skews- no cost options in the 1nc make the 2ac impossible and kills in round education – 1 condo solves your offense

#### Perm do the plan and withdraw from impositions like the maintenance of a neoliberal subject

#### Vague alts are a voter

#### Plan solves meltdowns

**Wheeler 10** – Workforce Planning Manager with Entergy; Producer “This Week in Nuclear” Podcast (John, 11/21 “Small Modular Reactors May Offer Significant Safety & Security Enhancements.” http://thisweekinnuclear.com/?p=1193)

They are smaller, so the amount of radioactivity contained in each reactor is less. So much less in fact, that even if the worst case reactor accident occurs, the amount of radioactive material released would not pose a risk to the public. In nuclear lingo we say SMRs have a smaller “source term.”  This source term is so small we can design the plant and emergency systems to virtually eliminate the need for emergency actions beyond the physical site boundaries.  Then, by controlling access to the site boundary, we can eliminate the need for off-site protective actions (like sheltering or evacuations). These smaller reactors contain less nuclear fuel.  This smaller amount of fuel (with passive cooling I’ll mention in a minute) slows down the progression of reactor accidents.  This slower progression gives operators more time to take action to keep the reactor cool.  Where operators in large reactors have minutes or hours to react to events, operators of SMRs may have hours or even days. This means the chance of a reactor damaging accident is very, very remote. Even better, most SMRs are small enough that they cannot over heat and melt down. They get all the cooling they need from air circulating around the reactor. This is a big deal because if SMRs can’t melt down, then they can’t release radioactive gas that would pose a risk to the public.  Again, this means the need for external emergency actions is virtually eliminated. Also, some SMRs are not water cooled; they use gas, liquid salt, or liquid metal coolants that operate at low pressures.  This lower operating pressure means that if radioactive gases build up inside the containment building there is less pressure to push the gas out and into the air.  If there is no pressure to push radioactive gas into the environment and all of it stays inside the plant, then it poses no risk to the public. SMRs are small enough to be built underground. This means they will have a smaller physical footprint that will be easier to defend against physical attacks.  This provides additional benefits of lower construction costs because earth, concrete and steel are less costly than elaborate security systems in use today, and lower operating costs (a smaller footprint means a smaller security force).

#### Meltdowns cause extinction

Lendman 11 – Research Associate of the Centre for Research on Globalization (Stephe, 3/13. “Nuclear Meltdown in Japan” The People’s Voice <http://www.thepeoplesvoice.org/TPV3/Voices.php/2011/03/13/nuclear-meltdown-in-japan>)

Reuters said the 1995 Kobe quake caused $100 billion in damage, up to then the most costly ever natural disaster. This time, from quake and tsunami damage alone, that figure will be dwarfed. Moreover, under a worst case core meltdown, all bets are off as the entire region and beyond will be threatened with permanent contamination, making the most affected areas unsafe to live in. On March 12, Stratfor Global Intelligence issued a "Red Alert: Nuclear Meltdown at Quake-Damaged Japanese Plant," saying: Fukushima Daiichi "nuclear power plant in Okuma, Japan, appears to have caused a reactor meltdown." Stratfor downplayed its seriousness, adding that such an event "does not necessarily mean a nuclear disaster," that already may have happened - the ultimate nightmare short of nuclear winter. According to Stratfor, "(A)s long as the reactor core, which is specifically designed to contain high levels of heat, pressure and radiation, remains intact, the melted fuel can be dealt with. If the (core's) breached but the containment facility built around (it) remains intact, the melted fuel can be....entombed within specialized concrete" as at Chernobyl in 1986. In fact, that disaster killed nearly one million people worldwide from nuclear radiation exposure. In their book titled, "Chernobyl: Consequences of the Catastrophe for People and the Environment," Alexey Yablokov, Vassily Nesterenko and Alexey Nesterenko said: "For the past 23 years, it has been clear that there is a danger greater than nuclear weapons concealed within nuclear power. Emissions from this one reactor exceeded a hundred-fold the radioactive contamination of the bombs dropped on Hiroshima and Nagasaki." "No citizen of any country can be assured that he or she can be protected from radioactive contamination. One nuclear reactor can pollute half the globe.Chernobyl fallout covers the entire Northern Hemisphere." Stratfor explained that if Fukushima's floor cracked, "it is highly likely that the melting fuel will burn through (its) containment system and enter the ground. This has never happened before," at least not reported. If now occurring, "containment goes from being merely dangerous, time consuming and expensive to nearly impossible," making the quake, aftershocks, and tsunamis seem mild by comparison. Potentially, millions of lives will be jeopardized. Japanese officials said Fukushima's reactor container wasn't breached. Stratfor and others said it was, making the potential calamity far worse than reported. Japan's Nuclear and Industrial Safety Agency (NISA) said the explosion at Fukushima's Saiichi No. 1 facility could only have been caused by a core meltdown. In fact, 3 or more reactors are affected or at risk. Events are fluid and developing, but remain very serious. The possibility of an extreme catastrophe can't be discounted. Moreover, independent nuclear safety analyst John Large told Al Jazeera that by venting radioactive steam from the inner reactor to the outer dome, a reaction may have occurred, causing the explosion. "When I look at the size of the explosion," he said, "it is my opinion that there could be a very large leak (because) fuel continues to generate heat." Already, Fukushima way exceeds Three Mile Island that experienced a partial core meltdown in Unit 2. Finally it was brought under control, but coverup and denial concealed full details until much later. According to anti-nuclear activist Harvey Wasserman, Japan's quake fallout may cause nuclear disaster, saying: "This is a very serious situation. If the cooling system fails (apparently it has at two or more plants), the super-heated radioactive fuel rods will melt, and (if so) you could conceivably have an explosion," that, in fact, occurred. As a result, massive radiation releases may follow, impacting the entire region. "It could be, literally, an apocalyptic event.

#### Capitalism promotes peace and solves global war

Bernstein 2 **(Andrew, Senior Writer for the Ayn Rand Institute and Ph.D. in Philosophy, “The Nobel Peace Prize Should Go to Those Who Really Support Peace”, October 11, http://www.aynrand.org/site/News2?page=NewsArticle&id=5453)**

If one admires men who cause war, one will ignore or vilify men who promote peace. Those who respect and support individual rights and political/economic freedom are the only true lovers of peace. Private capitalists and businessmen are outstanding examples. Business requires the barring of the initiation of force. Businessmen deal with one another peacefully, by means of trade, persuasion and voluntary contracts and agreements. Because businessmen respect the rights of all individuals, they have helped liberate the best minds to innovate, invent and advance, and thereby helped produce great general prosperity and peace. By helping to spread free trade across the globe, they have created peaceful relations among the individuals of many nations. Yet perversely, capitalists are denounced as exploiters of man. If we sincerely seek to attain the inestimable value that is world peace, it is individual rights and therefore capitalism that we must endorse. Capitalism is the only political-economic system that protects individual rights by banning the initiation of force. As Ayn Rand observed, it was capitalism that gave mankind its longest period of peace--an era in which there were no wars involving the entire civilized world--from the end of the Napoleonic Wars in 1815 to the outbreak of World War I in 1914. If we truly want to recognize and promote the cause of peace, let us award a peace prize to Capitalism

#### Transitioning away from capitalism would collapse civilization and kill billions.

 **Rockwell 8** [Llewellyn H. Rockwell, Jr., President of the Ludwig von Mises Institute, 2008 [“Everything You Love You Owe to Capitalism,” Ludwig von Mises Institute, May 18th, Available Online at http://mises.org/story/2982, Accessed 10-04-2008 ]

Whatever the specifics of the case in question, socialism always means overriding the free decisions of individuals and replacing that capacity for decision making with an overarching plan by the state. Taken far enough, this mode of thought won't just spell an end to opulent lunches. It will mean the end of what we all know as civilization itself. It would plunge us back to a primitive state of existence, living off hunting and gathering in a world with little art, music, leisure, or charity. Nor is any form of socialism capable of providing for the needs of the world's six billion people, so the population would shrink dramatically and quickly and in a manner that would make every human horror ever known seem mild by comparison. Nor is it possible to divorce socialism from totalitarianism, because if you are serious about ending private ownership of the means of production, you have to be serious about ending freedom and creativity too. You will have to make the whole of society, or what is left of it, into a prison. In short, the wish for socialism is a wish for unparalleled human evil. If we really understood this, no one would express casual support for it in polite company. It would be like saying, you know, there is really something to be said for malaria and typhoid and dropping atom bombs on millions of innocents.

#### 8. Capitalism best ensures value to life

**Tracinski 8** Robert, editor of the Intellectual Activist, The Moral and the Practical,http://www.moraldefense.com/Philosophy/Essays/The\_Moral\_and\_the\_Practical.htm

Stated in more fundamental terms, capitalism is practical because it relies on the inexhaustible motive-power of self-interest. Under capitalism, people are driven by loyalty to their own goals and by the ambition to improve their lives. They are driven by the idea that one's own life is an irreplaceable value not to be sacrificed or wasted. But this is also a crucial moral principle: the principle that each man is an end in himself, not a mere cog in the collective machine to be exploited for the ends of others. Most of today's intellectuals reflexively condemn self-interest; yet this is the same quality enshrined by our nation's founders when they proclaimed the individual's right to "the pursuit of happiness." It is only capitalism that recognizes this right. The fundamental characteristics that make capitalism practical—its respect for the freedom of the mind and for the sanctity of the individual—are also profound moral ideals. This is the answer to the dilemma of the moral vs. the practical. The answer is that capitalism is a system of virtue—the virtues of rational thought, productive work, and pride in the value of one's own person. The reward for these virtues—and for the political system that protects and encourages them—is an ever-increasing wealth and prosperity

#### The alt causes global conflict -~-- we cannot turn of capitalism.

**Barnhizer 6** [David Barnhizer – Professor of Law at Cleveland State University, ‘Waking from Sustainability's "Impossible Dream”,’ Georgetown International Environmental Law Review Summer 2006, Chetan]

The scale of social needs, including the need for expanded productive activity, has grown so large that it cannot be shut off at all, and certainly not abruptly. It cannot even be ratcheted down in any significant fashion without producing serious harms to human societies and hundreds of millions of people. Even if it were possible to shift back to systems of local self-sufficiency, the consequences of the transition process would be catastrophic for many people and even deadly to the point of continual conflict, resource wars, increased poverty, and strife. What are needed are concrete, workable, and pragmatic strategies that produce effective and intelligently designed economic activity in specific contexts and, while seeking efficiency and conservation, place economic and social justice high on a list of priorities. n60 The imperative of economic growth applies not only to the needs and expectations of people in economically developed societies but also to people living in nations that are currently economically underdeveloped. Opportunities must be created, jobs must be generated in huge numbers, and economic resources expanded to address the tragedies of poverty and inequality. Unfortunately, natural systems must be exploited to achieve this; we cannot return to Eden. The question is not how to achieve a static state but how to achieve what is needed to advance social justice while avoiding and mitigating the most destructive consequences of our behavior.

#### SMR’s are key to successful desalination – solves water wars

Solan et al 10 – Assistant Professor of Public Policy & Administration and Director of the Energy Policy Institute at Boise State University (David, June. “Economic and Employment Impacts of Small Modular Nuclear Reactors.” Energy Policy Institute, Center for Advanced Energy Studies. http://epi.boisestate.edu/media/3494/economic%20and%20employment%20impacts%20of%20smrs.pdf)

Besides electricity generation, additional applications may be well-suited for SMR systems in the future. While the applicability of nuclear energy to additional applications is not dependent on facility size, the actual use of large nuclear facilities does not occur due to economic considerations. Currently, only a few countries utilize nuclear energy for non-generation purposes, primarily desalination and district heating (IAEA, 2008). A brief overview of the application possibilities for SMRs is provided below. Desalination.&&The IAEA has identified desalination as possibly the leading non-electric civilian use for nuclear energy. Water scarcity is becoming an increasingly problematic global issue in both developed and developing countries. As noted in an IAEA (2007) report, Because of population growth, surface water resources are increasingly stressed in many parts of the world, developed and developing regions alike. Water stress is counter to sustainable development; it engenders disease; diverts natural flows, endangering flora and fauna of rivers, lakes wetlands, deltas and oceans; and it incites regional conflicts over water rights. In the developing world, more than one billion people currently lack access to safe drinking water; nearly two and a half billion lack access to adequate sanitation services. This would only get worse as populations grow. Water stress is severe in the developed world as well…In light of these trends, many opportunities in both developed and developing countries are foreseen for supply of potable water generated using nuclear process heat or off-peak electricity (p. 23).

#### Extinction

Weiner 90 (Jonathan, Pulitzer Prize winning author, “The Next One Hundred Years”, p. 270)

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

#### Psychology makes the drive for growth inevitable—people aren’t satisfied with accepting less.

Friedman 5 — Benjamin M. Friedman, William Joseph Maier Professor of Political Economy at Harvard University, former Chair of the Department of Economics at Harvard University, holds a Ph.D. in Economics from Harvard University, 2005 (“Rising Incomes, Individual Attitudes, and the Politics of Social Change,” *The Moral Consequences of Economic Growth*, Published by Knopf Publishing Group, ISBN 0679448918, p. 80-82)

The key is that while everybody of course wants to have more income [end page 80] so as to enjoy a higher standard of living, better health, and a greater sense of security, our sense of what constitutes “more” for any of these purposes is mostly relative. Whenever people are asked how well off they think they are, they almost always respond by comparing their lives to some kind of reference point. 4 Further, whether most people think what they have or how they live constitutes “more” or “less” depends on how their circumstances compare to two separate benchmarks: their own (or their family’s) past experience, and how they see people around them living. The principal driving force underlying the positive influence that economic growth has over people’s attitudes, and through the political process therefore over the character of their society, is the interaction between how each of these two resp ective points of comparison affects people’s perceptions. Obviously nothing can enable the majority of the population to be better off than everyone else. But not only is it possible for most people to be better off than they used to be, that is precisely what economic growth means. The central question is whether, when people see that they are doing well (in other words, enjoying “more”) compared to the benchmark of their own prior experience, or their parents’—or when they believe that their children’s lives will be better still— they consequently feel less need to get ahead compared to other people. If so, then the reduced importance they attach to living better than others leads in the end to more wide-ranging benefits, for the society as a whole, whenever general living standards are increasing. Happiness depends, of course, on more than just money and the things money can buy. In surveys, most people say that their sense of satisfaction with their lives depends most on the strength of their family relationships and personal friendships, or their health, or their education, or their religious attachment, or their feeling of connection to a broader community beyond their own family, or their sense of being engaged in purposeful and productive work, or even on their everyday work environment. 5 In many surveys the single most important influence on adults’ happiness is whether they are married. (People who are, or who are living together as if they were, are typically happier.) 6 People with “extrovert” personalities also tend to be happier on average, perhaps simply because they have more friends. 7 Money matters too, however. People with more income typically enjoy not just a higher standard of living in terms of food, clothing, and housing but also better health (in part because of better access to medical care, but also because they drink and smoke less and get more exercise). They also have better educations and a stronger sense of security in the face of major life uncertainties. Familiar popular images of the business rat race [end page 81] notwithstanding, people with higher incomes on average also have more leisure time, and they mostly spend it in activities that foster the friendships they then say (in surveys) matter far more than money. Having at least some financial resources is even helpful in maintaining marriages, perhaps because it allows young couples to live on their own instead of with their parents. 8 At any given time, within a given country, people with lower incomes are far more likely to say that they are unhappy. 9 But the essential point is that how much income it takes to enjoy advantages like these is a relative matter, and the most obvious benchmark people have in mind when they draw such comparisons is their own past experience. People who live better now than they did before, or better than they recall their parents living, are likely to think they are doing well. Those who look back on better times— better for them and their families, that is— think they are not. As a result, psychological studies have repeatedly confirmed that people’s satisfaction depends less on the level of their income than on how it is changing. 10 But rising incomes are, in turn, what economic growth is all about.\* \* (footnote) The idea that satisfaction depends primarily on changes in economic well-being (to the extent that economic factors are important in this regard) is hardly new. Adam Smith observed that “all men, sooner or later, accommodate themselves to whatever becomes their permanent situation.” Hence “between one permanent situation and another, there [is], with regard to real happiness, no essential difference” (The Theory of Moral Sentiments, p. 149). Moreover, Smith claimed no originality for this view but attributed it to the Stoic philosophers of ancient Greece.

### 2AC – CP

#### Doesn’t solve the aff – the CP doesn’t remove licensing concerns or expedite the process, our loudermilk evidence indicates that there’s no nuclear renaiisance in the squo because licensing is moving too slow, but DoD involment expedites the process, the CP has ARPA-E which is part of the DOE procure the technology which doesn’t send the same signal

#### Perm do both –

#### CP links to politics because it’s still contentious because it’s about nuclear, AND it links to DoD tradeoff because you stil have the DoD procure it

#### DoD Action Avoids NRC Bureaucracy While Accelerating The Development Of SMR Technology

Butler 11 (LtCol Butler is currently assigned to Headquarters, North American Air Defense Command-U.S. Northern Command/J594 (Strategy, Policy, and Plans Directorate), Security Cooperation ntegration Branch. Glen Butler.  Lieutenant Colonel. Why The Marine Corps Should Lead The Environmental And Energy Way Forward And How To Do It.  March 18, 2011. [http://www.mca-marines.org/gazette/not-green-enough-http://www.mca-marines.org/gazette/not-green-enough](http://www.mca-marines.org/gazette/not-green-enough-http%3A/www.mca-marines.org/gazette/not-green-enough))

Fifth, the cumbersome, bureaucratic certification process of the Nuclear Regulatory Commission (NRC), often enough to scare away potential entrepreneurs and investors, is not necessarily a roadblock to success. The NRC is “responsible for licensing and regulating the operation of commercial nuclear power plants in the United States.” Military installations offer unique platforms that could likely bypass an extended certification process. With established expertise and a long safety record in nuclear reactor certification, operations, training, and maintenance, the Naval Nuclear Propulsion Program comprises the civilian and military personnel who: . . . design, build, operate, maintain, and manage the nuclear-powered ships and the many facilities that support the U.S. nuclear-powered naval fleet.”34 Bypassing the NRC and initiating SMR experimentation under ADM Hyman Rickover’s legacy umbrella of naval reactors could shorten the process to a reasonable level for Marine and naval installations.35

#### DOD bypasses and solves licensing lag.

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.

#### DoD needs to lead

Butler 11 Glen Butler, Lt. Col., 2011, Not Green Enough, [www.mca-marines.org/gazette/not-green-enough](http://www.mca-marines.org/gazette/not-green-enough)

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

### 2AC - Politics

#### Heg solves

#### Indo-Pak war is coming now over water – only the plan can solve

Hussain 11 [Dr. Akmal Hussain 11, The Express Tribune, “Pakistan’s water crisis”, 8-25, <http://tribune.com.pk/story/231905/pakistans-water-crisis/>]

A water crisis is emerging which could have major implications for Pakistan’s economy and society. Effective management of this crisis first requires urgent mitigation and adaptation measures with close cooperation amongst Pakistan’s provinces of Khyber-Pakhtunkhwa, Punjab and Sindh on the one hand and then between Pakistan and India on the other. If the necessary collaboration for cooperative management of the Indus basin water resources is not undertaken expeditiously, the resultant economic crisis could lead to a war with India.¶ The problem of water scarcity in the Indus basin is predicated partly on the inherent limitations of water supply in the Indus River System and partly on the growing water demand associated with inefficient water use in the process of economic and population growth. Unsustainable development practices have exacerbated the problem with intrusion of salinity into the ground water, contamination of aquifers with harmful chemicals such as fluoride and arsenic and pollution of surface water due to lack of an institutional framework for environmentally safe disposal of urban and industrial waste. An important dimension of the water issue in the years ahead is the phenomenon of climate change, which could take the crisis to a critical level.¶ Water scarcity can be measured by the availability of water compared with the generally accepted minimum per capita requirement of 1,700 cubic metres per person per year. In their book, Freshwater Under Threat: South Asia, Mukand S Babel and Shahriar M Wahid have estimated that the per capita availability of water in the Indus basin is 1,329 cubic metres per capita per year. This is significantly below the threshold requirement. Another interesting indicator of the water problem is the measure of development pressure on water resources, which is the percentage of available water supply relative to the total water resources. This ratio is as high as 89 per cent for the Indus basin compared to only 15 per cent for the Ganges-Brahmaputra-Meghna (GBM) basin. This indicates the relatively greater development pressure on the Indus basin.¶ Worse, the utilisation of water for production is also highly inefficient by global standards. Water use efficiency is measured in terms of the GDP per unit of water used. In the case of the five top food producers in the world (Brazil, China, France, Mexico and the US) the water use efficiency is $23.8 per cubic metre. The figure is as low as $3.34 for the Indus basin.¶ The problem of water scarcity is expected to become more acute in the future due to the adverse impact of climate change. Dr Leena Srivastava, in a recent research paper, provides evidence to show that some of the Himalayan glaciers are melting more rapidly than the global average and this could increase the frequency of floods in the short run and increase water shortages in the long term by reducing river flows in South Asia. Furthermore, according to the UN’s Intergovernmental Panel on Climate Change report, given the sensitivity of existing seeds to heat, global warming could result in a 30 per cent reduction in the yield per acre of food crops in South Asia.¶ Science and empirical evidence make clear that existing water scarcity, when combined with the impact of climate change, could place critical stress on the economy and society of Pakistan in particular and South Asia in general: major food shortages, increased frequency of natural disasters, large scale dislocations of population and destabilising contention between upper and lower riparian regions.¶ Effective management of this crisis in Pakistan requires close cooperation with India in joint watershed management, increasing the efficiency of irrigation and water use, joint development of technologies, sustainable agriculture practices and institutional arrangements to manage food shortages as well as natural disasters. When faced with a common threat, ideology must be replaced by rationality in the conduct of governance. If we fail to do so, natural disasters could trigger the man-made catastrophe of war.

#### The risk of nuclear exchange is low and heg solves the impact

**Lavoy 03** - Senior Lecturer of National Security Affairs @ Naval Postgraduate School. [Peter R. Lavoy (Former Director for Counterproliferation Policy in the Office of the Secretary of Defense & Ph.D. in Political Science from the University of California, Berkeley) and MAJ Stephen A. Smith, “The Risk of Inadvertent Nuclear Use Between India and Pakistan,” Strategic Insight, February 3, 2003, pg. http://www.ccc.nps.navy.mil/rsepResources/si/feb03/southAsia2.asp]

Large-scale conventional warfare between India and Pakistan almost certainly would include air and ballistic missile attacks. Attacks by these inherently dual-use systems have the potential to be interpreted as pre-emptive attacks to destroy or neutralize the adversary's nuclear capability. This is especially true for Pakistan since India has invested heavily in improving its intelligence gathering and precision-strike capability. India also has made a major investment in defensive measures, including a limited ballistic missile defense.[12] Pakistan may believe that India is trying to gain the ability to launch a pre-emptive attack and deny Pakistan the ability to counter with an effective second-strike with a reduced force. Could this concern lead Pakistan to adopt a launch-on-warning or launch-under-attack posture where any Indian air- or ballistic missile attack could be interpreted as a pre-emptive strike and cause Pakistan to launch its nuclear weapons? Pakistan's limited ability to identify and attack India's strategic nuclear assets probably precludes any appreciable loss of India's retaliatory capability even if Pakistan launched a pre-emptive attack. This condition is reinforced by India's greater strategic depth, and its superior air and ballistic missile defenses. An air- or ballistic missile attack on India probably would elicit a strong response, but probably not a nuclear response. Conclusion - India and Pakistan do not want war; and they certainly do not want to fight a nuclear war. As strong as this desire is, however, New Delhi and Islamabad are caught in a spiral of tension and mistrust that could cause the next regional crisis to flair into armed conflict. If India and Pakistan do find themselves engaged in a large-scale conventional war, escalation to a nuclear exchange probably would be averted because of the strategic balance that now obtains. However, their asymmetrical conventional force capabilities and doctrines could create pressures for one side to launch nuclear weapons, even if they would prefer not to. The three scenarios of inadvertent war outlined above show how India's superior conventional military power might so seriously degrade the Pakistan national command authority's confidence in its nuclear deterrent that a nuclear war begins that nobody wants. Even if the risk of inadvertent nuclear war is judged to be low, steps should be taken to ensure that India and Pakistan do not become embroiled in even a limited war. The United States can play a constructive role in the region by taking steps to help keep the peace and reorienting its arms transfer policy to help stabilize the military balance.

#### No India/Pakistan war –

#### A) Deterrence

Giorgio et al 10 (Maia Juel, Tina Søndergaard Madsen, Jakob Wigersma, Mark Westh, “Nuclear Deterrence in South Asia: An Assessment of Deterrence and Stability in the Indian – Pakistan Conflict,” Global Studies, Autumn, http://dspace.ruc.dk/bitstream/1800/6041/1/Project%20GS-BA%2c%20Autumn%202010.pdf)

To what extent has nuclear deterrence enhanced stability in the India-Pakistan conflict? Recalling the logical structure of the paper, we here wish to reconcile the three analyses and offer a coherent synthesis of the results in relation to the research question. In order to gather the threads it is beneficial to shortly reflect upon the main results of the three analyses. Firstly, the aim with the thesis was to explore if there is nuclear deterrence between India and Pakistan, based upon Waltz three requirements. After having undertaken this analysis, we can conclude that Waltz’s requirements for effective nuclear deterrence are in fact fulfilled in both countries. Thus, from a neorealist perspective, is it then possible to deduce that stability reigns between India and Pakistan as a result of nuclear deterrence? Taking a point of departure in neorealist assumptions and nuclear deterrence theory, there is indeed stability between India and Pakistan, as no major war has taken place between the countries, and more importantly, nuclear war has been avoided. Nuclear deterrence has thus been successful in creating stability on a higher structural level.

#### Instability is inevitable

Blanco, 09 (Long Live Democracy: The Determinants of Political Instability in Latin America, <https://docs.google.com/viewer?url=http://www.ou.edu/cas/econ/wppdf/instabilityinla%2520rg.pdf&embedded=true&chrome=true>)

Ranked as the third most unstable region in the world in the post-war era, political instability has been a pervasive problem in Latin America. 1 In our sample of 18 Latin American countries from 1971-2000, there were 20 coups d’etat, 451 political assassinations, 217 riots, and 113 crises that threatened to bring down the sitting government. 2 Only three Latin American countries were consistently democratic over the thirty year period: Costa Rica, Colombia, and Venezuela. 3 All of the rest of the countries switched from a democracy to an autocracy (or vice versa) at least once. In sum, political instability is a persistent and pernicious problem in the region. 4 Given the many studies that document the negative relationship between instability and capital accumulation (Alesina & Perotti (1996); Alesina et.al. (1996)), it is likely that this instability has hampered economic development in the region. In this paper, we seek to uncover the factors behind this instability. In a

In this paper we analyze the determinants of political instability in a panel of 18 Latin American countries from 1971 to 2000. Not only is Latin America an interesting region to study because of it’s unusually persistent problems with instability, but focusing on a small sample helps us to avoid potential problems with pooling data from a large set of very different countries. 5 We find three main interesting results: First, regime type is a significant determinant of instability in the area. Countries with higher democracy scores also have lower average political instability, which indicates that recent moves to increased democracy in the region may bring about less instability in the future. This result is tempered though by our finding that long lived democracies have a greater chance of experiencing instability than equally long lived autocracies. Second, we find that income inequality and ethnic fractionalization are both important factors behind instability. Countries with low (or high) levels of inequality have less average instability than countries with average levels of inequality, and ethnic fractionalization has a non linear effect on political instability. Increases in ethnic fractionalization lower instability until a certain level of diversity, at which point any increases in diversity are associated with higher political instability. Third, we find that many of the macroeconomic variables included in our estimation (including the level and standard deviation of inflation and government budget deficit) are only weakly significant at best. Only lagged values of trade openness and investment are helpful in explaining current political instability.

PC doesn’t work – what bone

#### Won’t pass- fighting and timeframe

Soto 2/1[Victoria DeFrancesco Soto Dr. Victoria M. DeFrancesco Soto is an MSNBC and NBCLatino contributor, and a fellow and adjunct professor at the LBJ School of Public Policy at the University of Texas., 2/1/13, <http://tv.msnbc.com/2013/02/01/reality-check-on-immigration-reforms-obstacles/>]

Immigration reform also has an active advocate in President Obama and a Senate chamber that can make the push. That’s the good news. Now for the bad news. There are two big and messy inter-related obstacles-the details and time. Devil is in the details The immigration reform proposals put forward by the Senate and the president are very similar. Both call for more border enforcement, a pathway to citizenship, guest worker permits, and employer enforcement. The one major difference however is in the detail of when undocumented persons can be granted citizenship. Under the Senate plan eligibility of a green card is contingent on, “requiring our proposed enforcement measures be complete.” This is no minor detail. While in theory the Senate plan puts forward a path to citizenship, in practice, it’s a stop gap. This condition would allow anti-immigrant forces to indefinitely postpone a pathway to citizenship by claiming that undocumented immigration hasn’t been sufficiently enforced. The Senate’s conditional clause is what it means for the devil to be in the details. It is over this clause that the bi-partisan chumminess of the Senate will fall apart. Democrats will not want their hands tied, and Republicans will want to look tough. Beyond the Senate, the pathway to citizenship condition will not play well with the president. Obama has staked out immigration as one of his legacy issues and is not going to allow the Senate to move forward with a bill that in practice does not include a pathway to citizenship. The enforcement condition leads to the second main obstacle that could see the 2013 immigration reform never see the light of day, time. A ticking time bomb For immigration reform to become a reality it must be passed by the end of July before Congresses’ summer recess. If it is not passed by then, consider immigration reform as good as dead. The House of Representatives will be the biggest challenge to immigration reform because of its Republican majority. The closer we get to the 2014 primary season, the greater the number of GOP House members who will get skittish about voting for reform. Immigration reform will not be wildly popular with the Republican base, but at least if there is the buffer of time it will give representatives more freedom to support immigration reform. If immigration reform is not passed before members of Congress go home to their districts for summer recess then we could see a replay of the disastrous Health Care Reform town halls of 2009. Anti-immigration reform media outlets and conservative public voices (e.g. Rush Limbaugh, the National Review) have already started stoking public opinion against immigration reform. Come August, town halls could turn amnesty into the new “death panels” and scare the begeezus out of all Republicans. By design Congress **is a slow-moving vehicle**. Incrementalism, not sweeping change, is the name of the game. As such, comprehensive immigration reform faces a built-in institutional speed bump. Add to that the time the inter-party and inter-branch haggling that the conditional clause will take. The president currently has momentum, but it won’t last long; more specifically, it’ll last him till August.

#### Contraception thumps the DA

Fox 2/1 [Maggie, NBC News, 2/1/13, <http://vitals.nbcnews.com/_news/2013/02/01/16809018-white-house-tries-for-new-compromise-on-birth-control?lite>]

The Obama administration is taking another stab at a compromise over the contentious issue of making employers pay for birth control, offering a way for women to get the coverage without forcing religiously affiliated organizations to pay for it. The proposed new rule would have insurance companies provide the coverage free of charge through separate, individual health insurance policies. It’s not quite clear how much it would cost or who, exactly, would end up paying for it. “Under the proposed accommodations, the eligible organizations would not have to contract, arrange, pay or refer for any contraceptive coverage to which they object on religious grounds, the proposed rule reads. The 2010 Affordable Care Act requires all health insurers to pay for a woman’s contraceptive care without charging her anything. Religious organizations such as the Catholic Church, which oppose artificial birth control, have objected strongly. While churches and other overtly religious organizations were always exempted, things were a little fuzzier for religiously affiliated organizations, such as universities, and private employers who said they had their own personal conscientious objections. Some employers who don’t oppose birth control in general oppose the requirement that products such as emergency birth control, which they equate with abortion, be supplied. At least 44 lawsuits have been filed against the government over the issue, The Becket Fund for Religious Liberty, a legal organization helping oppose the mandate, says. It has been a big thorn in the side for the Obama administration.

#### Link is non-unique – Obama already pushed SMRs and has taken credit for it, should’ve sapped his capital

#### SMRs have bipartisan support

Sullivan 10 (Mary Anne Sullivan – Partner in Hogan Lovells' energy practice in Washington, D.C., Daniel F. Stenger – Partner in Hogan Lovells' energy practice in Washington, D.C., Amy C. Roma – Senior associate in Hogan Lovells' energy practice in Washington, D.C., Are Small Reactors the Next Big Thing in Nuclear?, November 2010, Electric Light & Power, Nov/Dec2010, Vol. 88 Issue 6, p46)

Congress SMRs have enjoyed **bipartisan support** in Congress. The House Committee on Science and Technology and the Senate Energy and Natural Resources Committee have approved similar legislation designed to promote the development and deployment of SMRs along the lines the DOE has proposed. Promoting SMR development in legislation has its price. The Congressional Budget Office recently estimated that the Senate bill would cost $407 million over the next five years to support cost-sharing programs with private companies for the development of two standard SMR designs. Costs for the out-years were not included in the estimate, but the bill would require the DOE to obtain NRC design certifications for the reactors by 2018 and to secure combined construction and operating licenses by Jan. 1, 2021. If Congress can pass an energy bill, it seems likely the bill **will support SMRs**. Even in the absence of new authorizing legislation, however, **appropriations bills** that must be passed to **keep the government running** almost certainly will contain strong support for the DOE's research and development program for SMRs. SMRs respond to a critical suite of power needs: reliable, low-carbon, baseload generation at a manageable capital cost for even small utilities. But as with many other power solutions, much still needs to happen to realize the promise

#### Not intrinsic – a logical policymaker can do the plan and pass immigration reform

#### Obama pushing SMRs now

Ervin 12-28 [Dan Ervin is a professor of finance at Salisbury University, “Dan Ervin: Modular reactors are the future of nuclear energy”, December 28th, 2012, <http://www.delmarvanow.com/article/20121230/OPINION03/312300005>, Chetan]

The Obama administration’s decision to kick-start commercial use of small modular reactors has made one thing clear: The notion that nuclear power is slipping away is wrong. Although nuclear power faces difficult challenges, industry and government are working together to forge a new path. The Department of Energy has earmarked funds for a new public-private partnership to help develop innovative small reactors that are about one-third the size of those in large conventional nuclear plants. These small reactors are modular, meaning they will be built in factories before they are shipped and installed at nuclear sites. This production method has the potential to reduce the cost of nuclear power significantly

#### PC not key

**Dickinson 9** – professor of political science at Middlebury College and taught previously at Harvard University where he worked under the supervision of presidential scholar Richard Neustadt (5/26/09, Matthew, Presidential Power: A NonPartisan Analysis of Presidential Politics, “Sotomayor, Obama and Presidential Power,” http://blogs.middlebury.edu/presidentialpower/2009/05/26/sotamayor-obama-and-presidential-power/, JMP)

As for Sotomayor, from here the path toward almost certain confirmation goes as follows: the Senate Judiciary Committee is slated to hold hearings sometime this summer (this involves both written depositions and of course open hearings), which should lead to formal Senate approval before Congress adjourns for its summer recess in early August. So Sotomayor will likely take her seat in time for the start of the new Court session on October 5. (I talk briefly about the likely politics of the nomination process below). What is of more interest to me, however, is what her selection reveals about the basis of presidential power. Political scientists, like baseball writers evaluating hitters, have devised numerous means of measuring a president’s influence in Congress. I will devote a separate post to discussing these, but in brief, they often center on the creation of legislative “box scores” designed to measure how many times a president’s preferred piece of legislation, or nominee to the executive branch or the courts, is approved by Congress. That is, how many pieces of legislation that the president supports actually pass Congress? How often do members of Congress vote with the president’s preferences? How often is a president’s policy position supported by roll call outcomes? These measures, however, are a misleading gauge of presidential power – they are a better indicator of congressional power. This is because how members of Congress vote on a nominee or legislative item is **rarely influenced by anything a president does.** Although journalists (and political scientists) often focus on the legislative “endgame” to gauge presidential influence – will the President swing enough votes to get his preferred legislation enacted? – **this mistakes an outcome with actual evidence of presidential influence.** Once we control for other factors – **a member of Congress’ ideological and partisan leanings, the political leanings of her constituency, whether she’s up for reelection or not – we can usually predict how she will vote without needing to know much of anything about what the president wants.** (I am ignoring the importance of a president’s veto power for the moment.) Despite the much publicized and celebrated instances of presidential arm-twisting during the legislative endgame, then, most legislative outcomes don’t depend on presidential lobbying.

#### DoD shields the link

Merchant 10 (Political & Environment Columnist-Discovery, 10/21, “How the US Military Could Bring Solar Power to Mass Market,” http://www.treehugger.com/corporate-responsibility/how-the-us-military-could-bring-solar-power-to-mass-market.html)

Furthermore, **Congress is infinitely more likely to approve funding for R&D**; and infrastructure **if the projects are military-related**. Which is depressing, but true -- the one thing that **no politician can get caught opposing is the safety of American troops.** In fact, the whole premise of the article is rather depressing, on point though it may be: The only way we may end up getting a competitive clean energy industry is through serious military investment, which is of course, serious government spending. Which **under any other guise would be vehemently opposed by conservatives**.

#### Winners Win

**Green 10** 6/11/10 – professor of political science at Hofstra University (David Michael Green, 6/11/10, " The Do-Nothing 44th President ", http://www.opednews.com/articles/The-Do-Nothing-44th-Presid-by-David-Michael-Gree-100611-648.html)

Moreover, there is a continuously evolving and reciprocal relationship between presidential boldness and achievement. In the same way that nothing breeds success like success, nothing sets the president up for achieving his or her next goal better than succeeding dramatically on the last go around**.** This is absolutely a matter of perception, and you can see it best in the way that Congress and especially the Washington press corps fawn over bold and intimidating presidents like Reagan and George W. Bush. The political teams surrounding these presidents understood the psychology of power all too well. They knew that by simultaneously creating a steamroller effect and feigning a clubby atmosphere for Congress and the press, they could leave such hapless hangers-on with only one remaining way to pretend to preserve their dignities. By jumping on board the freight train, they could be given the illusion of being next to power, of being part of the winning team. And so, with virtually the sole exception of the now retired Helen Thomas, this is precisely what they did.

#### Fiat solves the link – the plan isn’t debated in Congress

#### DoD shields the link

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

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

### 2AC – DoD DA

#### Multilateral structures check escalation

Desker 8 (Barry, Dean – S Rajaratnam School of International Studies, “Why War is Unlikely in Asia: Facing the Challenge from China”, 6-4, http://www.iiss.org/conferences/asias-strategic-challenges-in-search-of-a-common-agenda/conference-papers/fifth-session-conflict-in-asia/why-war-in-asia-remains-unlikely-barry-desker/)

War in Asia is thinkable but it is unlikely.  The Asia-Pacific region can, paradoxically, be regarded as a zone both of relative insecurity and of relative strategic stability.  On the one hand, the region contains some of the world’s most significant flashpoints – the Korean peninsula, the Taiwan Strait, the Siachen glacier – where tensions between nations could escalate to the point of resulting in a major war.  The region is replete with border issues, the site of acts of terrorism (the Bali bombings, Manila superferry bombing, Kashmir, etc.), and it is an area of overlapping maritime claims (the Spratly Islands, Diaoyutai islands, etc).  Finally, the Asia-Pacific is an area of strategic significance, sitting astride key sea lines of communication (SLOCS) and important chokepoints. Nevertheless, the Asia-Pacific region is more stable than one might believe.  Separatism remains a challenge but the break-up of states is unlikely.  Terrorism is a nuisance but its impact is contained.  The North Korean nuclear issue, while not fully resolved, is at least moving toward a conclusion with the likely denuclearization of the peninsula.  Tensions between China and Taiwan, while always just beneath the surface, seem unlikely to erupt in open conflict (especially after the KMT victories in Taiwan).  The region also possesses significant multilateral structures such as the Asia-Pacific Economic Cooperation (APEC) forum, the Shanghai Cooperation Organization (SCO), the nascent Six Party Talks forum and, in particular, ASEAN, and institutions such as the EAs, ASEAN + 3, ARF which ASEAN has conceived.

#### Not intrinsic – a logical policymaker can choose to fund both other DoD projects and SMRs

#### DOD increased counter-terror funding- thumps the disad

Purlain 8/10 (Ted Purlain, BioPrep Watch, “DOD to increase funding of nerve agent medical countermeasure program”, <http://www.bioprepwatch.com/weapons_of_bioterrorism/dod-to-increase-funding-of-nerve-agent-medical-countermeasure-program/324924/>, August 10, 2012, LEQ)

Pharmathene, Inc., recently announced that the U.S. Department of Defense plans to exercise an option to accelerate funding for its nerve agent medical countermeasure program. Pharmathene said the option is contingent on the countermeasure rBChE achieving key milestones in its development. “We believe this is a timely decision given the recent headlines about the potential threat of chemical weapons. PharmAthene is proud to be working in collaboration with the DoD to address this threat and provide innovative new solutions for our partners,” Eric I. Richman, the president and CEO of Pharmathene, said. “We have enjoyed a productive collaboration with the DoD for many years, beginning with our first generation nerve agent countermeasure, Protexia which completed a Phase I clinical study. We are pleased to be continuing our partnership to advance a next generation platform to deliver a flexible and efficient manufacturing approach, and a cost-effective solution to our government client in support of this important national security initiative.” RBChE, a recombinant form of human butyrycholinesterase, is a protein that is naturally occurring and found in minute quantities of human blood. It acts as a bioscavenger that can absorb toxins before they cause irreversible nerve damage. Pharmathene’s non-clinical animal studies have shown that rBChE can provide protection against nerve agent poisoning when administered before exposure and may increase survival rates when administered post-exposure.

#### No link- the plan doesn’t require the DOD spend money until the SMR’s are operational- whatever is on the “chopping block” will have already passed by then- or something else would have triggered it-

#### Fuel costs spill-over and destroy the DOD budget

Freed 12 Josh, Vice President for Clean Energy, Third Way, “Improving capability, protecting 'budget”, May 21, <http://energy.nationaljournal.com/2012/05/powering-our-military-whats-th.php>

As Third Way explains in a digest being released this week by our National Security Program, the Pentagon’s efforts to reduce energy demand and find alternative energy sources could keep rising fuel costs from encroaching on the budgets of other important defense programs. And the payoff could be massive. The Air Force has already been able to implement behavioral and technology changes that will reduce its fuel costs by $500 million over the next five years. The Army has invested in better energy distribution systems at several bases in Afghanistan, which will save roughly $100 million each year. And, using less than 10% of its energy improvement funds, the Department has begun testing advanced biofuels for ships and planes. This relatively small investment could eventually provide the services with a cost-effective alternative to the increasingly expensive and volatile oil markets. These actions are critical to the Pentagon’s ability to focus on its defense priorities. As Secretary Panetta recently pointed out, he’s facing a $3 billion budget shortfall caused by “higher-than-expected fuel costs.” The Department’s energy costs could rise even further if action isn’t taken. DOD expects to spend $16 billion on fuel next year. The Energy Information Administration predicts the price of oil will rise 23% by 2016, without a major disruption in oil supplies, like the natural disasters, wars, and political upheaval the oil producing states have seen during the last dozen years. Meanwhile, the Pentagon’s planned budget, which will remain flat for the foreseeable future, will require significant adjustment to the Department’s pay-any-price mindset, even if sequestration does not go into effect. Unless energy costs are curbed, they could begin to eat into other budget priorities for DOD. In addition, the Pentagon’s own Defense Science Board acknowledges that using energy more efficiently makes our forces more flexible and resilient in military operations, and can provide them with greater endurance during missions. Also, by reducing energy demand in the field, DOD can minimize the number of fuel convoys that must travel through active combat zones, reducing the chances of attack to avoiding casualties and destruction of material. At our domestic bases, DOD is employing energy conservation, on-site clean energy generation, and smart grid technology to prevent disruptions to vital activities in case the civilian grid is damaged by an attack or natural disaster. The bottom line is, developing methods and technologies to reduce our Armed Forces’ use of fossil fuels and increase the availability of alternative energy makes our military stronger. That’s why the Pentagon has decided to invest in these efforts.

#### Plan saves money

Causbie and Hart 12 Lieutenant Colonel Steven Hart, Cadet Hanson Causbie, West Point, New York, United States Military Academy, May 13, “Deployable Nukes: The Future Of Nuclear Power In The Deployed Environment”, PDF Online

Ten years of operating in the deployed environment have brought to light a number of challenges faced by the United States Army. Over the course of the past decade we have developed our counterinsurgency and stability strategy operations, refined the training of our troops in a variety of fields, and fielded new equipment to help us fight and win in our current operations. Overall, we have adapted to our new environment well and created a fighting force more capable, lethal, and agile than perhaps ever before. Unfortunately, the advancement of our technology and strategy has not extended to that of infrastructure development, particularly power production. Power production and the fuel necessary for the process are a vital element of stability operations and the sustainment of troops in the deployed environment. The equipment needed to support power production, usually diesel generators, are costly and require constant time and attention to keep them operational. These generators are also heavy polluters, releasing carbon dioxide as well as other byproducts from burning diesel fuel. Additionally, thousands of gallons of fuel are required to power these generators. This fuel is often difficult to transport as well as dangerous especially in the regions where U.S. troops currently operate. A new source of power production is necessary to replace the military’s currently dirty and costly system and provide our service members with the clean, reliable, and safe power they need to fight and win our nation’s wars. Luckily, this power source has already existed for a number of years. Since its introduction in the 1960s nuclear power has continued to grow and advance at an exponential rate. The nuclear power of today is far beyond where it was even ten years ago. Clean, safe, and easy to maintain, nuclear power facilities also provide a substantial amount of power with a relatively small amount of waste compared to that of coal, natural gas, and diesel generators. With new and self- contained units now on the market nuclear power is able to be provided to almost any region in the world at a reasonable cost and with few safety risks. This new nuclear technology is also an excellent fit for deployed environment because of its self-contained operation, low fuel intake, high power output, and clean operation. This paper will assess the feasibility and practicality of small nuclear power plants for use by the United States Army in the deployed environment as an alternative to other methods of power production. Through the data presented it can be seen that the deployment of small nuclear power facilities could save the Army millions of dollars annually while substantially cutting fuel requirements. Additionally, the Army would cut its environmental waste production and leave its allied partners with a sustainable energy source which could be used for up to a decade. This paper is broken into four sections. First, the paper will present some statistics on the current power production methods in the deployed environment and data regarding fuel consumption. Next the paper will examine available nuclear technology and the benefits as well associated risks with this equipment in addition to the costs of this equipment. Third, the two methods of power production will be compared with the advantages and disadvantages of both discussed in detail. Finally, the study will close with conclusions on both power sources as well as the future of power production in the deployed environment. CURRENT POWER REQUIREMENTS AND PRODUCTION The current operational environment has completely changed the power requirements for deployed troops. In World War II, for example, a soldier consumed an average of one gallon of fuel a day. In Iraq and Afghanistan the average soldier now consumes twenty gallons of fuel daily.1 Such an increase has resulted in the Marine Corps tripling its use of energy in the deployed environment in the past ten years.2 The training, deployment, and support of military forces in the field now consume 75% of the energy used by the Department of Defense.3 In Afghanistan approximately 30% of operational fuel is used to supply power to forward deployed bases.4 70% of the logistics operations in Afghanistan and Iraq are devoted to fuel and water, a staggering amount of time and effort for only two of the thousands of resources the military must supply to its service members.5 In 2008 the Department of Defense was supplying 68 million gallons of fuel to OIF and OEF per month, or roughly 2 million gallons of fuel daily.6 In 2010, the Department of Defense spent $15 billion on fuel.7 The consumption of fuel for power is only one element of the power production process. For fuel to be consumed it must first be transported to the site requiring power. This is oftentimes one of the most dangerous jobs in the deployed environment. In Afghanistan 80% of convoys are dedicated to the transport of fuel.8 These convoys are extremely deadly, responsible for an average of one soldier killed or injured for every 24 convoys.9 Convoys have become such a danger that Marine Corps Major General Richard Zilmer sent the Pentagon a “Priority 1” request for renewable energy in order to bring awareness of the issue to higher. In 2011, the Pentagon published its first ever energy plan to address the burgeoning need for power on the battlefield. In the report the Pentagon spoke extensively about reducing the military’s energy footprint through the use of non-oil energy sources.10 The report concluded that reduction in oil usage must be reduced not only to shrink the logistical footprint of deployed troops but also because of the possible “disruption of oil supplies” in the near future.11 Size and Demands Base camps vary in size and the scope of the number of troops they must support. From platoon- sized Combat Outposts (COP) to a Forward Operating Base (FOB) of 25,000 soldiers and contractors COPs and FOBs have differing power demands depending on their mission and the equipment and troops they support. According to ATP 3-37.10, the Army’s guide to building base camps, base camps are built in four sizes. The smallest base camps are built for 50 to 299 people and are no larger than 150 by 250 meters.12 The largest base camps are for a population of 6,000 or greater with the dimensions determined by the individual planners.13 This study will focus on the latter category to include base camps of the “megabase” variety supporting up to 30,000 soldiers and contractors. This size of base camp would be the easiest to institute changes in the power infrastructure because of the massive amount of required and would also be the easiest to emplace nuclear power production facilities. The type and scope of power production also depends on the size of the base camp. At the smallest COPs there may be no source of power expect for batteries for radios and other equipment. Conversely, at Balad Air Base in Iraq the Air Force powered the base with a “generator farm” containing a number of 40 foot MILVANs holding 12 cylinder diesel generators.14 At Camp Leatherneck in Afghanistan the five megawatts of power is supplied by 196 generators consuming 15,431 gallons of fuel daily.15 On smaller FOBs and COPs power is obviously produced on a much more austere scale than the megabases of Balad and Leatherneck. Many of the generators used on larger base camps are Mobile Electric Power (MEP) units.16 One of the most common of the MEP units is the 750 KW MEP 012A Prime Power Units. These generators are powered by Cummins turbocharged twelve cylinder engines and weigh 25,000 pounds. On average these units consume 55 gallons of diesel fuel per hour.17 Many of these 012A generators are gradually being replaced by Deployable Power Generator and Distribution Systems (DPGDS) which are 25% lighter and 15% more fuel efficient than their 012A predecessors.18 82% of the generators in the deployed environment are Tactical Quiet Generators (TQG).19 These generators are available in six major models and range in size from medium suitcases to full-size tractor trailers.20 Power output for these generators ranges from as little as 3 kW to as much as 100 kW.21 These generators are usually used during early stages of a campaign or at smaller FOBs and COPs where transportation of larger generators is difficult or impossible. Varying estimates exist for the amount of power required for a large FOB and the assets which reside at the base. FOBs which support aviation assets require far more fuel than those supporting solely ground assets. One senior military official estimated that the average Army brigade (3,500 to 4,000 soldiers) requires 10,000 gallons of fuel daily or 2.5-2.8 gallons of fuel per soldier per day.22 Fuel costs range from $6.35 per gallon to as much as $45.00 per gallon for FOBs and COPs located on the “tactical edge,” or locations far from combat infrastructure and deep in enemy territory. These prices include transport and fees for the fuel required by contractors.23 Some of this fuel, however, is necessary for vehicles which are not powered by generators. Therefore, power requirements per soldier often give a more accurate picture of fuel requirements for FOBs. ATP 3.37.10 calls for anywhere from 1.5 to 3.5 KW required for each individual on a FOB.24 Approximated Power Costs A series of calculations are necessary for an accurate idea of the power and fuel requirements and the respective cost for a FOB of 25,000 soldiers and contractors. Using an average of 2 KW required per individual a FOB of 25,000 requires 50,000 KW or 500 MW of power. Assuming that the FOB is powered by the new DPGDS, consuming 47 gallons of fuel per hour at 750 KW, the base would require a minimum of 67 generators burning 3,149 gallons of fuel per hour. At a standardized price of $10.00 a gallon the cost per hour of generation is $31,490 or $755,760 per day. These calculations have been greatly simplified with a number of additional factors which must be taken into consideration. First, a number of power generation sources may be employed at a megabase described in this experiment. The construction of a more permanent power plant may decrease costs while the use of older, less efficient generator may increase fuel consumption and thus costs. Similarly, the fluctuation of fuel costs also changes the overall costs as does the fluctuation of contractor costs and contracts. Finally, this estimate does not include estimates on maintenance as well as the cost for additional generators. Many of the generators used on FOBs run at no more than 30% capacity because of maintenance issues. FOBs are also required to have more generators in case of maintenance issues or a sudden surge in power requirements.25 NUCLEAR POWER PRODUCTION AND REQUIREMENTS As can be seen in the preceding section power production through the use of generators can often be inefficient, expensive, and plagued with maintenance issues. This section will discuss the available nuclear technology for the deployed environment as well as the costs associated with this technology. Available Technology A number of nuclear reactor designs are available at varying costs and power outputs. Many of these designs are currently only available on paper while others have entered the initial stages of production. All of the designs, however, share common features which make them appropriate to the deployed environment. The first feature is their size. Reactors range in size from as small as a residential hot tub to as large as a van. This compactness allows these units to achieve specific fabrication and performance goals not found in large light water reactors. 26 Second is the self- containment of these units. Most of the current designs are simply installed in the required location and then left alone with the only maintenance required at the time of removal or refuel.27 Finally, these mini reactors are significantly safer than the prior generations of nuclear technology. Current reactors, known as Generation IV reactors, have fewer moving parts and fewer systems, thus decreasing the points of failure and thus danger of the units.28 Illustration 1 (see below) outlines a few of available nuclear power units available on today’s market. All of these units are self-contained and differ in the length of their service as well as their power output. Name Manufacturer Generating Capacity Fueling Cycle Transportable Gen4 Module (formerly Hyperion Power Module) Gen4 Energy (formerly Hyperion Power Generation) 25 (MW), scalable 8-10 years, returned to factory for refueling and waste removal Ship, rail, or truck NuScale NuScale 45 MW, scalable 2 years, on-site refueling and spent fuel cooling Ship, rail, or truck mPower The Babcock and Wilcox Company 125 MW, scalable 4.5 years, on-site refueling and waste storage Ship or rail Illustration 1: Nuclear Power Reactor Designs29 All of the units above are manufactured and then transported in their entirety to their on-site locations.30 Some of the larger units may require to be sent in components because of their size. Even though the units are self-contained they do require additional infrastructure to distribute power including but not limited to cooling towers and condensers, a steam turbine, and additional support services. Associated Costs Even though all of the above products are capable of operating in the deployed environment the Gen4 Module will be used as the example unit for a number of reasons. First, the Gen4 Module is the smallest and most transportable unit, thus making it an easier unit to integrate into FOBs and begin the transition to nuclear power. Second, the Gen4 Module is the closest to development with delivery of the first units by June of 2013.31 Finally, the Gen4 Module has some important technological advances over its counterparts which make it even more appropriate for the deployed environment. These characteristics will be discussed in detail below. The Gen4 Module is 1.5 meters wide by 2.5 meters high and is a completely self-contained unit with each reactor stocked with ten years of uranium.32 The entire unit, including fuel, weighs approximately 20 tons and requires movement by a heavy haul truck.33 The unit fits into many standard shipping containers as well, making air or water travel fairly straightforward.34 After ten years, or when the uranium has reached 15% uranium enrichment, the reactor module is replaced with a new module within the plant and the old module is shipped back to the manufacturing facility for disposal. The plant can continually produce 25 MW of power for entire ten year life of the reactor core. 35 Each unit is scheduled to cost between $25 million and $30 million dollars.36 Construction on-site will be limited to the reactor vault, water support systems, and connection of the plant to the current power infrastructure.37 Illustration 2 offers a glimpse of the dimensions and design of the unit. Illustration 2: Gen4 Energy Module38 As opposed to other light water reactor designs, the primary cooling system of the Gen4 module is not water. Instead, the reactor is cooled using a lead and bismuth composite, known as LBE. This alloy is non-reactive to air and water and has an exit temperature of 500C, thus making it much safer than water because of its higher boiling point. This makes the reactor much less susceptible to overheating.39 Additionally, such a reactor requires far less water than a traditional reactor with the only water being that in the secondary cooling loop which is self-contained within the power plant.40 Therefore, instead of the need to draw water from an exterior water source the Gen4 Module can operate on approximately 10,000 gallons of water per hour.41 This would require approximately 20,000 gallons of water to be in the system at all times.42 Assuming each unit to cost $30 million, a FOB of 25,000 personnel would require a minimum of twenty of these units to meet power demands for a total of $600 million for ten years of power production. Therefore, the total cost per day comes to approximately $164,384.00. It is important to note that this cost does not include the cost of vault construction, transport of the unit to site, or construction of the cooling system and necessary water required for the cooling of the reactor. The final construction of the power plant to support the Gen4 Module can be seen in Illustration 3. Much of this material, however, is readily available and easily transported to the deployed environments. For example, steam generators capable of supporting 25 MW of power are readily available in the commercial market and are sized to be transported with relative ease.43 After some additional research a reasonable estimate for the added cost of support structures, training, and water requirements necessary for the reactor an additional $8 million plus $3 million dollars annually would be a likely figure for each power plant. This would put the total cost of operation at $372,603.00, still less than half of the costs associated with the current power infrastructure. Even with these rough estimates using approximated numbers the benefits of nuclear technology in the deployed environment are substantial. COMPARISON After calculating the cost per day for each type of technology it can be seen that nuclear power provided by the Gen4 module costs approximately $372,603.00 per day compared to the $755,760.00 for diesel generators. Therefore, nuclear power appears to be over 50% less than the current power infrastructure in our deployed environment. Nonetheless, a number of other factors must be taken into consideration when considering the costs and considerations of nuclear power compared to diesel generators. As stated above, estimated numbers were used for predicting the costs in addition to the cost of the reactor itself. Therefore, fluctuation in costs of transport, training of personnel, water, and additional material necessary for power plant construction may drastically alter the affordability of such power plants. 25 MW steam turbines, for example, may cost as much as $2 million and vary by manufacturer and design. The need for extra training is another added cost of nuclear power. Even though Gen4 Energy includes operator training, licensing support, and technical support with the installation of their units contractors must be hired or Army personnel must be retrained in order to install the modules as well as to address any maintenance or safety issues with the plants.45 It is quite possible, however, that training for Amy personnel could be provided by other branches. The Navy, for example could provide the training or even the personnel for the sustainment of nuclear facilities. The Army may also require additional security and safety measures because of the dangers of nuclear power even though the units are buried underground and thus safe from threats of terrorism or theft. Even though the reactors discussed are buried underground and are relatively isolated from terrorist threats more research and analysis needs to be done by both the Army as well as the manufacturer to address security concerns. These challenges do not exist with the current power infrastructure. Personnel are already trained to maintain generators with minimum security and safety requirements. Generators also do not require special transport as they are not considered as volatile and dangerous as their nuclear counterparts. Additionally, the stigma associated with nuclear power does not exist with diesel power production. Education of the military population regarding the safety of nuclear power as well as our coalition partners is essential to successful use of this technology. While a host nation may not have an issue with diesel generators they may have concerns with the installation of a nuclear power facility on their own soil. CONCLUSIONS AND RECOMMENDATIONS Even with the additional costs and limitations nuclear power provided by small reactors is still a viable option for the future of Army operations in the deployed environment. However, this technology may only work in certain areas suitable for this new technology. First, the technology is more cost-effective in larger FOBs because of cheaper transportation costs as well as the current high security state of these facilities. Large FOBs may also have greater access to the good and services necessary for the construction and maintenance of these facilities. Finally, larger FOBs allow for the refinement of this technology before such units are deployed closer to the tactical edge.