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#### A. Interpretation—

#### 1. Nuclear energy production is measured by installed capacity

IAEA 8 [International Atomic Energy Agency, “A Newsletter of the Division of Nuclear Power,” Nuclear Power Newsletter, Vol. 5, No. 3, September, <http://www.iaea.org/Resources/Women/pdf/nenp0908.pdf>]

Energy production of nuclear power plants is a result of an installed capacity and effectiveness of its utilization. In 2007 there was no permanent shutdown, compared to eight in 2006, therefore the installed capacity was driven by investment into construction of new NPPs and into power uprating of existing reactor units. Three new reactors were connected to the grid and one long-term shutdown reactor was reconnected. The total installed capacity of the nuclear industry has risen from 369.8 to 372.2 GW(e) during 2007. Utilization of installed capacity can be measured by the energy availability factor (EAF). It is the percentage of maximum energy generation the plant is ready to supply to the electrical grid to meet its demand.

#### 2. Production incentives are used to stimulate output—distinct from R&D

Suranovic 10 [Steve, associate professor of economics and international affairs at the George Washington University, PhD in economics from Cornell, International Trade: Theory and Policy, v. 1.0, “8.2 Domestic Production Subsidies,” <http://catalog.flatworldknowledge.com/bookhub/reader/28?e=fwk-61960-ch08_s02>]

Domestic production subsidies are generally used for two main reasons. First, subsidies provide a way of raising the incomes of producers in a particular industry. This is in part why many countries apply production subsidies on agricultural commodities: it raises the incomes of farmers. The second reason to use production subsidies is to stimulate output of a particular good. This might be done because the product is assumed to be critical for national security. This argument is sometimes used to justify subsidies to agricultural goods, as well as steel, motor vehicles, the aerospace industry, and many other products. Countries might also wish to subsidize certain industries if it is believed that the industries are important in stimulating growth of the economy. This is the reason many companies receive research and development (R&D) subsidies. Although R&D subsidies are not strictly production subsidies, they can have similar effects.

#### 3. For is exclusive

Clegg, 95 - J.D., 1981 Yale Law School; the author is vice president and general counsel of the National Legal Center for the Public Interest. (Roger, “Reclaiming The Text of The Takings Clause,” 46 S.C. L. Rev. 531, Summer, lexis)

Even if it made no sense to limit the clause to takings "for public use"--and, as discussed below, it might make very good sense--that is the way the clause reads. It is not at all ambiguous. The prepositional phrase simply cannot be read as broadening rather than narrowing the clause's scope. Indeed, a prepositional phrase beginning with "for" appears twice more in the Fifth Amendment, and in both cases there is no doubt that the phrase is narrowing the scope of the Amendment. n20

#### B. Violation—the plan is an incentive for R&D

#### C. Vote neg—

#### 1. LIMITS—allowing research & development of random energy sources expands the topic to a theoretical number of energy sources—impossible to predict.

#### 2. GROUND—the only unified neg ground is energy production—futuristic sources guarantee the aff AT WORSE a massive delay before they link to the only ground on the topic.

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#### Text: The United States federal government should develop beamed thermal propulsion technology to disposes of fissile waste materials beyond the Earth’s mesosphere. The Nuclear Regulatory Commission should remove relevant and necessary regulation and restriction that prevents the commercialization of small modular reactors.

#### Space disposal solves the nuclear waste problem—it’s cheap, efficient, safe, feasible, and prototype technologies have been used in the past.

Coopersmith, professor of history, 5—associate professor of history at Texas A&M University, specializes in the history of technology and the history of Russia [August 22, 2005, Jonathan Coopersmith, “Nuclear waste in space?” http://www.thespacereview.com/article/437/1]

Neither the space shuttle nor conventional rockets are up to this task. Not only are they expensive, but they lack the desired reliability and safety as insurance rates demonstrate. Instead, we need to develop a new generation of launch systems where the launcher remains on the ground so the spacecraft is almost all payload, not propellant. As well as being more efficient, ground-launched systems are inherently safer than rockets because the capsules will not carry liquid fuels, eliminating the in-flight danger of an explosion. Nor will the capsules have the pumps and other mechanical equipment of rockets, further reducing the chances of something going wrong. We need to develop a new generation of launch systems where the launcher remains on the ground so the spacecraft is almost all payload, not propellant. How would disposal of nuclear wastes in space actually work? In the simplest approach, a ground-based laser system will launch capsules directly out of the solar system. In a more complicated scheme, the laser system will place the capsules into a nuclear-safe orbit, at least 1,100 kilometers above the earth, so that they could not reenter for several hundred years at a minimum. Next, a space tug will attach the capsules to a solar sail for movement to their final destination orbiting around the sun, far, far from earth. The underlying concept is simple: the launcher accelerates the capsule to escape velocity. Like a gun, only the bullet heads toward the target, not the entire gun. Unlike a shuttle or rocket, ground systems are designed for quick reuse. To continue the analogy, the gun is reloaded and fired again. These systems would send tens or hundreds of kilograms instead of tons into orbit per launch. Of the three possible technologies—laser, microwave, and electromagnetic railguns—laser propulsion is the most promising for the next decade. In laser propulsion, a laser beam from the ground hits the bottom of the capsule. The resultant heat compresses and explodes the air or solid fuel there, providing lift and guidance. Although sounding like science fiction, the concept is more than just an elegant idea. In October 2000, a 10-kilowatt laser at White Sands Missile Range in New Mexico boosted a two-ounce (50 gram) lightcraft over 60 meters vertically. These numbers seem small, but prove the underlying feasibility of the concept. American research, currently at Rensselaer Polytechnic Institute in New York with previous work at the Department of Energy’s Lawrence Livermore National Laboratory in California, has been funded at low levels by the United States Air Force, NASA, and FINDS, a space development group. The United States does not have a monopoly in the field. The four International Symposiums on Beamed Energy Propulsion have attracted researchers from Germany, France, Japan, Russia, South Korea, and other countries. The long-term benefit of a ground-based system will be much greater if it can ultimately handle people as well as plutonium. Dartmouth physics professor Arthur R. Kantrowitz, who first proposed laser propulsion in 1972, considers the concept even more promising today due to more efficient lasers and adaptive optics, the technology used by astronomers to improve their viewing and the Air Force for its airborne anti-ballistic missile laser. Where should the nuclear waste ultimately go? Sending the capsules out of the solar system is the simplest option because the laser can directly launch the capsule on its way. Both Ivan Bekey, the former director of NASA’s of Advanced Programs in the Office of Spaceflight, and Dr. Jordin T. Kare, the former technical director of the Strategic Defense Initiative Organization’s Laser Propulsion Program, which ran from 1987-90, emphasized solar escape is the most reliable choice because less could go wrong. A second option, a solar orbit inside Venus, would retain the option of retrieving the capsules. Future generations might actually find our radioactive wastes valuable, just as old mine tailings are a useful source of precious metals today. After all, the spent fuel still contains over three-quarters of the original fuel and could be reprocessed. Terrorists or rogue states might be able to reach these capsules, but if they have that technical capability, stealing nuclear wastes will be among the least of our concerns. This approach is more complex, demanding a temporary earth orbit and a solar sail to move it into a solar orbit, thus increasing the possibility of something going wrong.

#### Demonstrating feasible waste disposal solves reprocessing.

Lyman, scientist with the UCS, 10 [October 12, 2010, Edwin S., Senior Staff Scientist Union of Concerned Scientists “Limiting Future Proliferation and Security Risks” Presentation to the Blue Ribbon Commission on America’s Nuclear Future Reactor and Fuel Cycle Technology Subcommittee Washington, DC]

--Elimination of reprocessing would greatly reduce resource burdens on international and domestic safeguards and reduce proliferation and terrorism risks

--The U.S. could help to discourage reprocessing around the world by

--Getting the domestic geologic repository program back on track and demonstrating the technical and political feasibility of direct disposal of spent fuel

--Ensuring that domestic requirements for securing weapon-usable materials are set at the highest levels and based on conservative assessments of current and future threats

Being realistic about the low potential for technological innovation to significantly increase the “proliferation resistance” of reprocessing or the accuracy of material accountancy methods at bulk-handing facilities

Using its bilateral nuclear cooperation authority more effectively

#### Current restrictions make SMR development impossible --- reform is necessary.

Rysavy et al 9 (Charles F, partner with the law firm of K&L Gates LLP and has over 15 years of legal experience with the nuclear industry, Stephen K. Rhyne is a partner with the law firm of K&L Gates LLP, Roger P. Shaw is a scientist with the law firm of K&L Gates LLP, has over 30 years of experience with the nuclear industry, and is the former Director of Radiation Protection for the Three Mile Island and Oyster Creek Nuclear Plants, "SMALL MODULAR REACTORS", December, apps.americanbar.org/environ/committees/nuclearpower/docs/SMR-Dec\_2009.pdf)

Most SMRs are not merely scaled down versions of large-scale reactors, but rather new in design, siting, construction, operation and decommissioning. Appropriately, the legal and regulatory issues these units will generate will not merely be scaled down versions of the issues faced by their much larger brethren. The NRC’s new reactor licensing regulations in 10 C.F.R. Part 52 are designed to provide a more streamlined process for new generation large-scale reactors. Some facets of this new process will be equally advantageous to SMRs, while others will range from awkward to nearly unworkable when applied to the licensing, construction, and operation of SMRs. Creative navigation of the existing regulations by both the NRC and licensees will solve some problems, but others can be solved only by amending the regulations. ¶ For example, the NRC’s annual fee to operate each licensed nuclear reactor is $4.5M under 10 C.F.R. Part 171, which would likely pose problems for the operation of many SMRs. In March 2009, the NRC published an advanced notice of proposed rulemaking that contemplates a variable fee structure based on thermal limits for each power reactor. 74 Fed. Reg. 12,735 (March 25, 2009). This or a similar change will be necessary to make SMRs financially viable. Likewise, the size of the decommissioning fund, insurance, and other liability issues could make SMRs uneconomical if not tailored to the smaller units. Moreover, the form of the combined operating and construction license (COL) must take into consideration that certain sites are likely to start out with a single SMR but later add multiple small reactors as needs evolve. Flexibility is one of the SMR’s primary benefits, and the governing regulatory structure must allow (and preferably embrace) that flexibility, while simultaneously ensuring the safety of these reactors. Another issue to consider is that the current Emergency Planning Programs require a 10-mile Emergency Planning Zone (EPZ) for all reactors, based on the size of existing large-scale reactors. Emergency Plans, 10 C.F.R. § 50.47 (2009). This requirement is almost certainly unjustifiable for a SMR. These smaller reactors are much less powerful, and in many cases the actual containment/reactor system will be placed underground.

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

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

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

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#### Immigration reform—top of the agenda, Obama is pushing, will get done—but it’s a fight

CSM 12/28/12 [Immigration reform likely to be at the top of Congress’ agenda in 2013, www.rawstory.com/rs/2012/12/28/immigration-reform-likely-to-be-at-the-top-of-congress-agenda-in-2013]

The momentum of President Obama's resounding victory in November's election—with a big push from Latinos and other minority groups—has catapulted immigration policy to the top of Washington's 2013 agenda, making reform not only possible but also likely.

The shift in the political conversation has been so dramatic that even a pathway to citizenship for some of the estimated 12 million undocumented immigrants in the United States—long rejected out of hand by most Republicans and some Democrats—could be part of the deal.

The task is momentous. It involves weighing the wishes of industries from agriculture to high-tech, as well as the sensitivities of opening the door to immigrant workers at a time when unemployment remains high.

The past only reinforces the potential difficulties ahead. In 1986, Republicans felt betrayed when Democrats stripped the enforcement provisions from a bill that offered citizenship to some 3 million illegal immigrants. By 2005, the issue had become so politically toxic to conservatives that they blocked President George W. Bush's push for a new round of immigration reform.

Yet with Election 2012 highlighting the electoral consequences of America's changing demographics, the next year appears to be ripe for compromise. How reforms might take shape could be a major point of contention between the parties, but lawmakers on both sides suddenly see an opportunity for what could be their most expansive achievement of 2013.

"It has to be in 2013," says Rep. Raúl Labrador (R) of Idaho, an immigration lawyer who thundered into Congress in the tea party wave of 2010. "If we wait until 2014, it's going to be election time. And you know how efficient we are here during election time."

Recent weeks have seen a flurry of activity on Capitol Hill. In the Senate, a "Gang of Eight"—led by longtime immigration reformers Sen. Chuck Schumer (D) of New York and Republican Sens. John McCain of Arizona and Lindsey Graham of South Carolina—has added freshman Sens. Michael Bennett (D) of Colorado and Mike Lee (R) of Utah, while potential 2016 presidential aspirant Sen. Marco Rubio (R) of Florida leads his own initiative.

Members of the House have seen movement, too. "One thing clearly has changed," says Rep. Luis Gutierrez (D) of Illinois, the lawmaker who co-wrote a 2005 comprehensive immigration reform measure with now Sen.-elect Jeff Flake (R) of Arizona. "Nobody is talking about self-deportation. Nobody is talking about how [Arizona's controversial immigration law] should be the standard applied across the land. Nobody is talking about vetoing the DREAM Act," which offers a path to citizenship for some young undocumented immigrants.

"We are having wonderful conversations," Representative Gutierrez says.

That more moderate tone from the GOP is what the November election has wrought.

In a postelection analysis and poll of Latino voters, Republican polling group Resurgent Republic offered a searing critique of the GOP's political strategy of pumping up turnout among white voters, often by championing hard-line policies on immigration issues that turn off key Asian and Hispanic voters.

"Republicans have run out of persuadable white voters," wrote conservative pollster Whit Ayres and Jennifer Korn, the head of the right-leaning Hispanic Leadership Network, in a recent research memo. "Trying to win a national election by gaining a larger and larger share of a smaller and smaller portion of the electorate is a losing political proposition."

Between 2008 and 2012, white voters shrank two percentage points to 72 percent of the electorate, while Asian and Latino voters expanded a percentage point each to 3 percent and 10 percent, respectively.

While GOP presidential candidate Mitt Romney won 60 percent of white voters, 71 percent of Latinos and 73 percent of Asian-Americans backed Mr. Obama—up four percentage points and 11 percentage points from 2008, respectively.

And those numbers of minority voters are only going to grow. For the next two decades, 50,000 Latino voters will turn 18 every month, adding an additional New Hampshire of voters to the US each year into the 2030s.

While Resurgent Republic's poll showed that Hispanics aren't singularly focused on immigration issues, Republican politicians who favor immigration reform see the issue as primary: The GOP's message of conservative family values, entrepreneurship, and individual freedom won't reach Latino voters unless the immigration question is solved.

"This is like a wall that stops the other issues from getting through," says Rep. Mario Diaz-Balart (R) of Florida, a longtime immigration reform advocate. "And while that wall is there, the Republican Party has a serious problem."

House Speaker John Boehner (R) of Ohio signaled a shift when he told ABC News a day after the election that "a comprehensive approach [to immigration] is long overdue, and I'm confident that the president, myself, others, can find the common ground to take care of this issue once and for all."

That's a departure from previous immigration-reform attempts, in which the GOP brass wasn't on board.

Perhaps just as important, though, is that several leading lawmakers with near-pristine conservative credentials are also involved.

Two tea party superstars—Senators Rubio and Lee, both of whom knocked out establishment Republican figures to win their seats—are going to be key players in any reform.

In the House, the involvement of House Judiciary chairman Rep. Bob Goodlatte (R) of Virginia and Representative Labrador of Idaho can provide cover to conservative lawmakers from the party's right flank.

"The fact that you're going to have strong conservative voices helping lead this debate is going to be critical to solving it instead of using it as a political wedge," says Rep. Steve Scalise (R) of Louisiana, incoming chairman of the Republican Study Committee, the largest and most conservative caucus in the House.

It's notable that both Labrador and Rubio believe in, one way or another, a path to citizenship for some illegal immigrants, even while they leave open just who can get on that path.

Some conservatives say any form of citizenship given to illegal immigrants—no matter the conditions attached to it—constitutes an "amnesty," which is a guarantee only of more illegal immigration unless the nation's borders are firmly secured and stringent workplace verification systems are put in place.

But a recent poll by George Washington University and Politico found 62 percent of Americans support a proposal that would allow illegal immigrants to earn citizenship over a period of several years, with 40 percent strongly supporting such a measure. Only 35 percent opposed it.

Some Democrats on the Hill are extending a friendly hand to the GOP. When the Congressional Hispanic Caucus—which is entirely Democratic—offered its vision for immigration reform, for example, it served up principles rather than a specific bill, a move received by Republicans as attempting to maximize common ground.

But Democrats also know they are in a position of power.

"You've got a realization on the part of GOP leadership not just in the House but in the Republican Party writ large that if they don't do something about it, they aren't going to win the presidency again," says Rep. Zoe Lofgren (D) of California, a leading immigration reform advocate.

For that reason, she says, Republicans "aren't going to get the credit" for pushing immigration through, but they "can still get the blame if they block" it.

Latino advocacy groups and labor unions, emboldened by the community's growing electoral power, vow to take the fight to those who stand in immigration reform's way in 2013.

"This comprehensive immigration reform for the Latino community is personal. The fact that we've come out in record numbers in 2012 was personal. And that's a calculation that members of Congress don't understand," says Maria Teresa Kumar, executive director of Voto Latino. "If they are not with us, 2014 may not look pretty with them."

The president, too, has political pressure to pursue immigration reform. He has already come up short once on immigration-reform promises: In 2009, he said that a comprehensive immigration solution would be a top priority.

Yet his first term also saw record numbers of undocumented immigrants deported. Only this summer, after he directed immigration officials to defer deportation of some young illegal immigrants, was he seen as making good on promises to the Latino community.

"The president says that his biggest failure in the first term was not moving forward with immigration reform," says Hector Sanchez, executive director of the Labor Council for Latin American Advancement. "The Latino community decided to give him a second chance."

Obama has publicly vowed to make immigration reform an immediate priority in his second term, which could begin just on the other side of the "fiscal cliff" negotiations.

"He's the one who has the mandate on this subject; he's the guy who got the voters who care most intensely about this," says Bruce Morrison, a former Democratic congressman from Connecticut who was involved in immigration reform efforts in the 1980s and early '90s.

And while Republicans are on board now, there's a reason they've been hesitant to tackle immigration reform in the past. For one, a vocal part of their base views any form of citizenship for illegal immigrants as a repudiation of the rule of law. Whether these voters—or their representatives—can be persuaded to accept amnesty is an open question.

"We can negotiate about the DREAMers and things like that, but the vast, vast majority of the people who are here illegally—say 12 million people—I think they came here after the age of 18. They knowingly violated the law, and we have to have respect for our law," Labrador says.

Moreover, increasing legal immigration above the current level of 1 million annually could be seen as a blow to those born in America.

Hurting "the American worker with bad immigration policy is not going to get [Republicans] more Hispanic votes," says Roy Beck, executive director of Numbers USA, a group that advocates lower immigration levels. "They've got to do something else."

In that respect, increasing legal immigration might be a difficult sell in 2013.

"I do not see Congress acting in this area in a robust way until the labor market is stronger," says Andrew Schoenholtz, deputy director for the Institute for the Study of International Migration at Georgetown University. "Just how strong is hard to tell."

And then there are the questions that perhaps matter most in the Beltway: Whose plan is on the table first? Which party sets the initial terms for debate?

#### IFR’s kill capital

Elias 8—San Diego Tribune Staff, Political Commentator [Thomas D. Elias, Why isn't this energy solution even on the table?, http://www.sddt.com/commentary/article.cfm?Commentary\_ID=109&SourceCode=20081010tza]

Remarkably, while proposals for renewed offshore oil drilling, new atomic power plants, expanded carbon trading and other proposed tactics abound in this year's presidential campaign, no one mentions the single most promising technique.

This may be because its name contains the word "reactor." Combined with the fact that it depends on a sophisticated form of nuclear technology, that appears to make the notion of power plants using the Integral Fast Reactor anathema to today's politicians.

But it shouldn't. For this technology is demonstrably safer than any existing nuclear power plant, depends almost completely on recycling for its fuel and would make virtually no contribution to worldwide climate change.

Yes, there are serious problems with today's version of nuclear power. The most difficult to solve is waste disposal, with almost no one wanting his or her backyard to be a dumping ground for spent radioactive fuel rods that will stay "hot" for eons. There are longstanding worries about effects of nuclear plants or their waste on water tables and ocean water temperatures. There are terrorism concerns. And there's the possibility -- slim, but still present -- of a meltdown or explosion loosing clouds of radioactivity into the air for many miles around. This has never happened in an American-designed atomic plant, but that doesn't stop people or politicians from worrying.

Meanwhile, no such concerns apply to the Integral Fast Reactor (IFR), designed at the Argonne National Laboratory in Illinois and its Idaho satellite facility during the 1980s and '90s at a cost of more than 1 billion taxpayer dollars.

The design was shelved and a small prototype essentially deep-sixed in 1994, ostensibly because of concerns that it might lead to proliferation of nuclear weapons.

Here are some of the advantages of the IFR, as listed by Steve Kirsch, a multimillionaire Silicon Valley software entrepreneur who has pushed the concept for several years:

These reactors can be fueled entirely with today's used nuclear fuel, consuming virtually all of the long-lived radio-isotopes that make storage of spent fuel rods such a problem. It would take IFRs centuries to use up the supplies of uranium that have already been mined, in part because this design is about 100 times more efficient in milking energy from uranium than those in use today.

IFRs require no enrichment of uranium, can be fueled with plutonium waste from other nuclear plants and emit almost no greenhouse gases. Such reactors would be cooled with liquid sodium, so they would not require massive water supplies and therefore can be located almost anywhere (read: isolated, desolate areas far from the large populations that might use the energy they produce).

The main disadvantage -- the one that killed the idea back in the mid-'90s -- is the fear that it would lead to proliferation of weapons-grade uranium because it is a form of "breeder" reactor that could theoretically produce more fissionable material than it uses.

But that's a matter of choice, making the breeder issue a red herring, an objection raised even though it has little merit only because it will alarm large numbers of people. For IFRs can be designed to use just as much fuel as they create, or more. In fact, it is today's thermal reactors that are large producers of ultra-dangerous plutonium.

The other problem with IFRs -- this one legitimate -- is that the liquid sodium cooling them could catch fire. But the scientists who developed the IFR design insisted that adding an extra cooling loop to each reactor would likely prevent this.

Kirsch maintains the IFR project was killed because it threatened oil companies, uranium mines, coal mines and natural gas companies. Which it would.

But George Stanford, a Ph.D. nuclear physicist who helped create the IFR design at Argonne, believes the main reason was fear of proliferation. "Well-meaning but ill-informed people claiming to be experts confused the issue and convinced many administrators and legislators the IFR was a threat," he said in a remarkable 2001 essay that can be accessed at nationalcenter.org/NPA378.html.

There is no doubt that American ingenuity has solved innumerable problems and won several wars. That same creativity also produced a power plant idea that could solve many of today's energy problems while doing little or no harm to citizens or the environment.

#### Capital key to passage—unforeseen events could change it

Shifter 12/27/12—President of the Inter-American Dialogue & adjunct professor of Latin American politics at Georgetown University’s School of Foreign Service [Michael Shifter, Will Obama Kick the Can Down the Road?, http://www.thedialogue.org/page.cfm?pageID=32&pubID=3186]

Not surprisingly, Obama has been explicit that reforming the US’s shameful and broken immigration system will be a top priority in his second term. There is every indication that he intends to use some of his precious political capital—especially in the first year—to push for serious change. The biggest lesson of the last election was that the “Latino vote” was decisive. No one doubts that it will be even more so in future elections. During the campaign, many Republicans -- inexplicably -- frightened immigrants with offensive rhetoric. But the day after the election, there was talk, in both parties, of comprehensive immigration reform.

Despite the sudden optimism about immigration reform, there is, of course, no guarantee that it will happen. It will require a lot of negotiation and deal-making. Obama will have to invest a lot of his time and political capital -- twisting some arms, even in his own party. Resistance will not disappear.

There is also a chance that something unexpected could happen that would put off consideration of immigration reform. Following the horrific massacre at a Connecticut elementary school on December 14, for example, public pressure understandably mounted for gun control, at least the ban of assault weapons. But a decision to pursue that measure -- though desperately needed -- would take away energy and time from other priorities like immigration.

#### Immigration reform expands skilled labor—spurs relations and economic growth in China and India.

LA Times 11/9/12 [Other countries eagerly await U.S. immigration reform, http://latimesblogs.latimes.com/world\_now/2012/11/us-immigration-reform-eagerly-awaited-by-source-countries.html]

"Comprehensive immigration reform will see expansion of skilled labor visas," predicted B. Lindsay Lowell, director of policy studies for the Institute for the Study of International Migration at Georgetown University. A former research chief for the congressionally appointed Commission on Immigration Reform, Lowell said he expects to see at least a fivefold increase in the number of highly skilled labor visas that would provide "a significant shot in the arm for India and China." There is widespread consensus among economists and academics that skilled migration fosters new trade and business relationships between countries and enhances links to the global economy, Lowell said. "Countries like India and China weigh the opportunities of business abroad from their expats with the possibility of brain drain, and I think they still see the immigration opportunity as a bigger plus than not," he said.

#### US-Indian relations avert South Asian nuclear war.

Schaffer 2 [Spring 2002, Teresita—Director of the South Asia Program at the Center for Strategic and International Security, Washington Quarterly, Lexis]

Washington's increased interest in India since the late 1990s reflects India's economic expansion and position as Asia's newest rising power. New Delhi, for its part, is adjusting to the end of the Cold War. As a result, both giant democracies see that they can benefit by closer cooperation. For Washington, the advantages include a wider network of friends in Asia at a time when the region is changing rapidly, as well as a stronger position from which to help calm possible future nuclear tensions in the region. Enhanced trade and investment benefit both countries and are a prerequisite for improved U.S. relations with India. For India, the country's ambition to assume a stronger leadership role in the world and to maintain an economy that lifts its people out of poverty depends critically on good relations with the United States.

### 1NC—DA 2

#### IFRs cause a net increase in prolif. Prefer our ev—it indicts all their authors.

Green 9—Jim Green, B. Med. Sci. (Hons.), PhD in science and technology studies for his analysis of the Lucas Heights research reactor debates, National nuclear campaigner - Friends of the Earth, Australia [August 1, 2009, “Nuclear Weapons and 'Fourth Generation' Nuclear Power,” http://www.energybulletin.net/49949]

The second major problem with the nuclear 'solution' to climate change is that all nuclear power concepts (including 'fourth generation' concepts) fail to address the single greatest problem with nuclear power − its repeatedly-demonstrated connection to the proliferation of Weapons of Mass Destruction (WMD). Not just any old WMDs but nuclear weapons − the most destructive, indiscriminate and immoral of all weapons.

Integral fast reactors

Integral fast reactors (IFRs) are reactors proposed to be fuelled with a metallic alloy of uranium and plutonium, with liquid sodium as the coolant. 'Fast' because they would use unmoderated neutrons as with other plutonium-fuelled fast neutron reactors (e.g. breeders). 'Integral' because they would operate in conjunction with on-site 'pyroprocessing' to separate plutonium and other long-lived radioisotopes and to re-irradiate (both as an additional energy source and to convert long-lived waste products into shorter-lived, less problematic wastes).

IFRs would breed their own fuel (plutonium-239) from uranium-238 contained in abundant stockpiles of depleted uranium. Thus there would be less global demand for uranium mining with its attendant problems, and less demand for uranium enrichment plants which can be used to produce low-enriched uranium for power reactors or highly enriched uranium for weapons. Drawing down depleted uranium stockpiles would be welcome because of the public health and environmental problems they pose and because one of the few alternative uses for depleted uranium − hardening munitions − is objectionable.

Pyroprocessing technology would be used − it would not separate pure plutonium suitable for direct use in nuclear weapons, but would keep the plutonium mixed with other long-lived radioisotopes such that it would be very difficult or impossible to use directly in nuclear weapons. Recycling plutonium generates energy and gets rid of the plutonium with its attendant proliferation risks. These advantages could potentially be achieved with conventional reprocessing and plutonium use in MOX (uranium/plutonium oxide) reactors or fast neutron reactors. IFR offers one further potential advantage − transmutation of long-lived waste radioisotopes to convert them into shorter-lived waste products.

In short, IFRs could produce lots of greenhouse-friendly energy and while they're at it they can 'eat' nuclear waste and convert fissile materials, which might otherwise find their way into nuclear weapons, into useful energy. Too good to be true? Sadly, yes. Nuclear engineer Dave Lochbaum from the Union of Concerned Scientists writes: "The IFR looks good on paper. So good, in fact, that we should leave it on paper. For it only gets ugly in moving from blueprint to backyard."

Complete IFR systems don't exist. Fast neutron reactors exist but experience is limited and they have had a troubled history. The pyroprocessing and waste transmutation technologies intended to operate as part of IFR systems are some distance from being mature. But even if the technologies were fully developed and successfully integrated, IFRs would still fail a crucial test − they can too easily be used to produce fissile materials for nuclear weapons.

IFRs and nuclear weapons

George Stanford, who worked on an IFR R&D program in the US, notes that proliferators "could do [with IFRs] what they could do with any other reactor − operate it on a special cycle to produce good quality weapons material."

As with conventional reactors, IFRs can be used to produce weapon grade plutonium in the fuel (using a shorter-than-usual irradiation time) or by irradiating a uranium or depleted uranium 'blanket' or targets. Conventional PUREX reprocessing can be used to separate the plutonium. Another option is to separate reactor grade plutonium from IFR fuel and to use that in weapons instead of weapon grade plutonium.

The debate isn't helped by the muddle-headed inaccuracies of some IFR advocates, including some who should know better. For example, Prof. Barry Brook from Adelaide University says: "IFRs cannot produce weapons-grade plutonium. The integral fast reactor is a systems design with a sodium-cooled reactor with metal fuels and pyroprocessing on-site. To produce weapons-grade plutonium you would have to build an IFR+HSHVHSORF (highly specialised, highly visible, heavily shielded off-site reprocessing facility). You would also need to run your IFR on a short cycle." Or to paraphrase: IFRs can't produce weapon grade plutonium, IFRs can produce weapon grade plutonium. Go figure.

Presumably Brook's point is that IFR-produced plutonium cannot be separated on-site from irradiated materials (fuel/blanket/targets); it would need to be separated from irradiated materials at a separate reprocessing plant. If so, it is a banal point which also applies to conventional reactors, and it remains the case that IFRs can certainly produce weapon grade plutonium.

Brooks' HSHVHSORFs are conventional PUREX plants − technology which is well within the reach of most or all nation states. Existing reprocessing plants would suffice for low-burn-up IFR-irradiated materials while more elaborate shielding might be required to safely process materials irradiated for a longer period. IFR advocate Tom Blees notes that: "IFRs are certainly not the panacea that removes all threat of proliferation, and extracting plutonium from it would require the same sort of techniques as extracting it from spent fuel from light water reactors."

IFR advocates propose using them to draw down global stockpiles of fissile material, whether derived from nuclear research, power or WMD programs. However, IFRs have no need for outside sources of fissile material beyond their initial fuel load. Whether they are used to irradiate outside sources of fissile material to any significant extent would depend on a confluence of commercial, political and military interests. History shows that non-proliferation objectives receive low priority. Conventional reprocessing with the use of separated plutonium as fuel (in breeders or MOX reactors) has the same potential to drawn down fissile material stockpiles, but has increased rather than decreased proliferation risks. Very little plutonium has been used as reactor fuel in breeders or MOX reactors. But the separation of plutonium from spent fuel continues and stockpiles of separated 'civil' plutonium − which can be used directly in weapons − are increasing by about five tonnes annually and amount to over 270 tonnes, enough for 27,000 nuclear weapons.

#### Domestic reprocessing shatters the norm against ENR and makes credible US diplomatic pressure impossible—ensures South Korean ENR

Sagan 11—Scott Sagan, political science professor at Stanford, co-chair Global Nuclear Future Initiative [April 18, 2011, “The International Security Implications of U.S. Domestic Nuclear Power Decisions,” http://cybercemetery.unt.edu/archive/brc/20120621005012/http://brc.gov/sites/default/files/documents/sagan\_brc\_paper\_final.pdf]

A similar phenomenon occurs when policy makers and scholars underestimate the international effect of the U.S. decision to abandon plutonium reprocessing in the 1970s. Skeptics claim that the fact that France and Japan, especially, went forward with their ambitious plutonium reprocessing efforts somehow demonstrates that U.S. efforts to constrain the global growth were a failure. But a more appropriate standard (but again more difficult to measure) for assessing our influence would estimate the number of states that would have developed plutonium reprocessing capabilities if the U.S. had not actively discouraged such fuel cycle activities after Jimmy Carter’s April 1997 order to cancel construction of commercial breeder reactors that employed a closed fuel cycle with plutonium reprocessing. The primary motivation behind the decision to postpone the development of this technology was a concern for the proliferation implications of the U.S. use of a closed fuel cycle. 17 The Carter administration reasoned that the decision to end reprocessing in the U.S. would have two effects: first, the U.S. could no longer act as an exporter of related technologies, limiting their availability; and second, it would create a normative change that would redefine the behavior of a responsible nuclear power state. Because we are estimating a counterfactual condition, it is not possible to measure definitively the effects of the Carter policy on the actual spread of reprocessing facilities around the world. Of the twenty-one countries that at some point in their history pursued plutonium reprocessing, ten have finished large-scale facilities and use them today: U.S., China, Israel, France, UK, India, Japan, Pakistan, Russia, and North Korea. 18 Algeria and the Czech Republic have a pilot-scale reprocessing plants, but have not moved towards further industrial development. 19 Nine countries abandoned their reprocessing programs: South Korea, Taiwan, Germany, Iraq, Italy, Argentina, Brazil, Belgium, and Yugoslavia. 20 The causes of these reversal decisions were complex, but in many of the cases U.S. diplomatic pressure was an important factor and that pressure was made more credible and acceptable because the U.S had given up its own civilian plutonium reprocessing programs. This “credibility” factor continues to be important today. South Korea is lobbying to renegotiate its agreements with the U.S. to be able to develop “pyro-processing,” a form of spent fuel reprocessing that supporters claim poses fewer proliferation risks than standard PUREX acqueous reprocessing. While this appears a challenge to the claim that the U.S. policy has had a positive influence, the very fact that the South Koreans are actively arguing that pyro-processing—unlike the PUREX process—does not separate out plutonium shows their awareness of the power of the norm against developing such technologies. While the U.S. government initially cooperated with South Korea on pyroprocessing research, Richard Stratford (Director of the Office of Nuclear Energy Affairs in the Bureau of Nonproliferation, U. S. Department of State) recently stated that the technology “moved to the point that the product is dangerous from a proliferation point of view,” and that the DOE now “states frankly and positively that pyro-processing is reprocessing.” The U.S. government position against pyro-processing in South Korea today is made more credible by the fact that the U.S. does not reprocess spend fuel for commercial purposes. 21

#### South Korean ENR undermines US non-prolif efforts with Iran, North Korea, and Southeast Asia.

Keck 12—Zachary Keck, Assistant Editor of The Diplomat [“Rough Waters? The State of the ROK-U.S. Alliance,” The Diplomat, August 22, 2012, http://thediplomat.com/flashpoints-blog/2012/08/22/rough-waters-the-state-of-the-rok-u-s-alliance/]

Washington’s concerns over South Korean’s nuclear ambitions have only been heightened by Seoul’s latest campaign to acquire indigenous enrichment and reprocessing facilities, which it is proscribed from doing under a nuclear pact it signed with Washington in 1974. In contrast, the U.S. has signed agreements recognizing Japan’s reprocessing and enrichment rights as well as India’s de facto reprocessing capability. Now, with the U.S. and South Korea renegotiating the 1974 nuclear pact that will expire in 2014, South Korea has demanded that Washington acquiesce to Seoul building enrichment and processing facilities. South Korea’s immediate interest in acquiring these capabilities is not nuclear weapons but rather further expanding its nuclear energy industry at home and abroad. Nonetheless, the U.S. has rejected South Korea’s request thus far, with President Obama’s top proliferation adviser, Garry Samore, telling South Korean reporters last month, “There is no danger that Korean industry will not be able to get access to low enriched uranium," Washington has a number of reasons to oppose South Korea’s request, many of which have nothing to do with Seoul. For instance, a key component of President Obama’s nuclear security agenda is the goal of securing all nuclear materials worldwide within four years. Allowing South Korea to begin producing its own fissile materials would run counter to this goal and undercut the administration’s important successes in reducing the number of countries that possess and produce these materials. Allowing South Korea to build these facilities would also undermine the current U.S.-led campaign to persuade Iran to abandon its own enrichment facilities. It would also adversely affect a number of U.S. objectives in the Asia-Pacific, including persuading Pyongyang to surrender its own nuclear program, according Japan a heightened status among U.S. allies, and keeping Southeast Asia’s budding nuclear energy programs on their current peaceful trajectories. Under the surface, however, Washington’s opposition is likely due in part to its uncertainty over South Korea’s long-term nuclear intentions. As noted above, South Korea already has a history of covertly seeking nuclear arms. That this took place before Seoul became a democracy is cold comfort to the U.S given that South Koreans have at times been overwhelming in favor of their country acquiring nuclear weapons. In other words, at a time when the region is undergoing sweeping changes, the U.S. is increasingly less confident that South Korea will continue to rely on Washington for its security indefinitely. Indeed, there are already a number of signs that Seoul is seeking greater autonomy. These come at a time when the U.S. will need South Korea more than ever in order to properly rebalance its forces in the region.

#### New Asian prolif ensures widespread nuclear conflict—asymmetries

Lyon 9 (December, Program Director, Strategy and International, with Australian Strategic Policy Institute, previously a Senior Lecturer in International Relations at the University of Queensland, “A delicate issue, Asia’s nuclear future”)

Deterrence relationships in Asia won’t look like East–West deterrence. They won’t be relationships of mutual assured destruction (MAD), and there will be many asymmetries among them. Regional nuclear-weapon states will articulate a spectrum of strategies ranging from existential deterrence to minimum deterrence to assured retaliation; and sometimes doctrinal statements will outrun capabilities. The smaller arsenals of Asia and the absence of severe confrontations will help to keep doctrines at the level of generalised deterrence. Extended nuclear deterrence will continue to be important to US allies in East Asia, although it is hard to imagine other Asian nuclear weapon states ‘extending’ deterrence to their clients or allies. Alagappa’s propositions contain a ‘picture’ of what a more proliferated Asia might look like. It could well remain a region where deterrence dominates, and where arsenals are typically constrained: an Asia, in fact, that falls some way short of a ‘nuclear chaos’ model of unrestrained proliferation and mushrooming nuclear dangers. An order in flux? Notwithstanding Alagappa’s more reassuring view, we shouldn’t understate the extent of the looming change from a nuclear relationship based on bipolar symmetry to a set of relationships based on multiplayer asymmetries. As one observer has noted, when you add to that change the relatively constrained size of nuclear arsenals in Asia, the likelihood of further nuclear reductions by the US and Russia, and ballistic missile defences of uncertain effectiveness, the world is about to enter uncharted territory (Ford 2009:125). Some factors certainly act as stabilising influences on the current nuclear order, not least that nuclear weapons (here as elsewhere) typically induce caution, that the regional great powers tend to get along reasonably well with each other and that the region enters its era of nuclear pre-eminence inheriting a strong set of robust norms and regimes from the earlier nuclear era. But other factors imply a period of looming change: geopolitical dynamism is rearranging strategic relationships; the number of risk-tolerant adversaries seems to be increasing; most nuclear weapons states are modernising their arsenals; the American arsenal is ageing; and the US’s position of primacy is increasingly contested in Asia. Indeed, it may be that dynamism which could most seriously undermine the Solingen model of East Asian nonproliferation. Solingen, after all, has not attempted to produce a general theory about proliferation; she has attempted to explain only proliferation in the post-NPT age (see Solingen 2007:3), when the P-5 of the UN Security Council already had nuclear weapons. In essence, though, it’s exactly that broader geopolitical order that might be shifting. It isn’t yet clear how the Asian nuclear order will evolve. It’s one of those uncertainties that define Australia’s shifting strategic environment. It’s not too hard to imagine an order that’s more competitive than the one we see now. The ‘managed system of deterrence’ The second approach to thinking about the Asian nuclear order is to attempt to superimpose upon it William Walker’s two key mechanisms of the first nuclear age: the ‘managed system of deterrence’ and the ‘managed system of abstinence’. What might those ‘systems’ look like in Asia? In Walker’s model, the managed system of deterrence included: the deployment of military hardware under increasingly sophisticated command and control; the development of strategic doctrines to ensure mutual vulnerability and restraint; and the establishment of arms control processes through which policy elites engaged in dialogue and negotiated binding agreements. (Walker 2007:436) It isn’t obvious that those core aspects of the ‘managed’ system are all central features of Asian nuclear relationships. Perhaps most importantly, it isn’t obvious that the world even has a good model for how deterrence works in asymmetric relationships. Within the US, there’s been something of a revival of interest in matters nuclear as strategic analysts attempt to reconceptualise how nuclear relationships might work in the future. Recent work on the problems of exercising deterrence across asymmetrical strategic contests, for example, suggests a number of problems: ‘In asymmetric conflict situations, deterrence may not only be unable to prevent violence but may also help foment it’ (Adler 2009:103). Some of the problems arise precisely because weaker players seem increasingly likely to ‘test’ stronger players’ threats—as part of a pattern of conflict that has emerged over recent centuries, in which weaker players have often prevailed against stronger opponents.3 If we were to look at the case study of the India–Pakistan nuclear relationship—which is grounded in an enduring strategic rivalry, and therefore not ‘typical’ of the broader nuclear relationships in Asia—it’s a moot point whether Pakistani behaviour has been much altered by the ‘deterrence’ policies of India. Indeed, the case seems to show that Pakistan doesn’t even accept a long-term condition of strategic asymmetry with India, and that it intends to use its nuclear weapons as an ‘equaliser’ against India’s larger conventional forces by building a nuclear arsenal larger than the Indian arsenal arrayed against it. That would imply, more broadly, that increasing strategic rivalries across Asia could be accompanied by efforts to minimise asymmetrical disadvantages between a much wider range of players. In short, in a more competitive Asian strategic environment, nuclear asymmetries that are tolerable now might well become less tolerable. Furthermore, we need to think about how we might ‘codify’ deterrence in Asia. In the Cold War days, the MAD doctrine tended to be reflected in arms control accords that limited wasteful spending and corralled the competition. As Walker acknowledges, the agreements were important ‘stabilisers’ of the broader nuclear relationship, but to what extent can they be replicated in conditions of asymmetry? It might be possible to codify crisis management procedures, but designing (and verifying) limitations on weapons numbers would seem to be much more difficult when the arsenals are of uneven size, and when the weaker party (perhaps both parties) would probably be relying on secrecy about the numbers and locations of weapons to minimise the vulnerability of their arsenals.

#### Extinction

Hayes 10 Peter Hayes, \*Executive Director of the Nautilus Institute for Security and Sustainable Development, AND, Michael Hamel-Green, \*\* Executive Dean of the Faculty of Arts, Education and Human Development act Victoria University (1/5/10, Executive Dean at Victoria, “The Path Not Taken, the Way Still Open: Denuclearizing the Korean Peninsula and Northeast Asia,” http://www.nautilus.org/fora/security/10001HayesHamalGreen.pdf

But the catastrophe within the region would not be the only outcome. New research indicates that even a limited nuclear war in the region would rearrange our global climate far more quickly than global warming. Westberg draws attention to new studies modelling the effects of even a limited nuclear exchange involving approximately 100 Hiroshima-sized 15 kt bombs2 (by comparison it should be noted that the United States currently deploys warheads in the range 100 to 477 kt, that is, individual warheads equivalent in yield to a range of 6 to 32 Hiroshimas).The studies indicate that the soot from the fires produced would lead to a decrease in global temperature by 1.25 degrees Celsius for a period of 6-8 years.3 In Westberg’s view:  That is not global winter, but the nuclear darkness will cause a deeper drop in temperature than at any time during the last 1000 years. The temperature over the continents would decrease substantially more than the global average. A decrease in rainfall over the continents would also follow…The period of nuclear darkness will cause much greater decrease in grain production than 5% and it will continue for many years...hundreds of millions of people will die from hunger…To make matters even worse, such amounts of smoke injected into the stratosphere would cause a huge reduction in the Earth’s protective ozone.4 These, of course, are not the only consequences. Reactors might also be targeted, causing further mayhem and downwind radiation effects, superimposed on a smoking, radiating ruin left by nuclear next-use. Millions of refugees would flee the affected regions. The direct impacts, and the follow-on impacts on the global economy via ecological and food insecurity, could make the present global financial crisis pale by comparison. How the great powers, especially the nuclear weapons states respond to such a crisis, and in particular, whether nuclear weapons are used in response to nuclear first-use, could make or break the global non proliferation and disarmament regimes. There could be many unanticipated impacts on regional and global security relationships5, with subsequent nuclear breakout and geopolitical turbulence, including possible loss-of-control over fissile material or warheads in the chaos of nuclear war, and aftermath chain-reaction affects involving other potential proliferant states. The Korean nuclear proliferation issue is not just a regional threat but a global one that warrants priority consideration from the international community.

### 1NC—Competitiveness

#### IFRs are only blueprints and won’t be competitive—empirics prove high costs.

Wauchope 7/5/12—Noel Wauchope works as a Division 1 registered nurse. Noel has been an anti-nuclear campaigner for many years and used to write for the now defunct Nation Review on the subject, as well as being the spokesperson for Women’s Electoral Lobby on nuclear issues. [July 5, 2012, “In dispraise of Integral Fast Nuclear Reactors,” http://www.independentaustralia.net/2012/environment/in-dispraise-of-integral-fast-nuclear-reactors/]

For instance, they ignore the fact that IFRs need plutonium or enriched uranium as fuel. So, to have fast reactors, Australia would need to import these, or set up nuclear reprocessing or uranium enrichment here. This would also involve issues such as cost, politics, public opinion, issues concerning our growing renewable energy systems, radioactive waste storage — just to mention some of the more obvious of the considerable obstacles to Australia ever getting fast reactors. Nuclear lobbyists seem naively oblivious to the importance of these factors in the minds of the general public.

In Australia, the high priest now is Barry Brook. He and his acolytes proselytise the case for Australia to get IFRs. This latest enthusiasm seems to have been inspired by Britain’s present crisis of nuclear waste.

Britain had, and still has, nearly 100 metric tonnes of weapons grade plutonium, to deal with. So, they set up the Thermal Oxide Reprocessing Plant (THORP) at Sellafield in Cumbria, which began operating in 1997. It was supposed to make money by recycling plutonium from spent fuel to make mixed oxide fuel (MOX) and then sell it overseas. Trouble was, it was a commercial disaster — costing $2.3 billion to build, and $750 million each year to run. It was closed in August 2011. So, what to do with the radioactive wastes? The cheapest and least dangerous solution was deep burial and the UK government is trying to persuade Cumbria to host an underground radioactive mausoleum — but, for some reason, the Cumbrians are not very keen on the idea…

So, along come the nuclear entrepreneur whiz kids.

Why not have another try at turning toxic wastes into a profitable export, they say. Sell them off overseas to other countries — we will design a gadget to use these, and sell the gadget, too! Enter the Integral Fast Reactors. The Brits are considering starting with one type of these, the Power Reactor Innovative Small Module — General Electric’s PRISM fast reactor. This reactor “consumes” weapons grade plutonium, producing electricity, and turning the plutonium into other radioactive wastes that are not quite as useful for making bombs. General Electric Hitachi proposes to “burn” the UK’s stockpile of plutonium in GEH’s Prism fast reactors”. It’s a complicated process.

Now, doesn’t that sound good?

It would get rid of Britain’s massive amount of plutonium wastes, make it (almost) unsuitable for weapons, make money for UK, and give cheap electricity to the colonials, hmm… say, in Australia! Yep, Barry Brook and his crew think that this is a great idea for Australia.

What’s wrong with this?

Lots.

First of all, I always think “follow the money”. Because of various factors, these reactors will be hugely expensive to build. The construction materials have to be especially tough and durable because of obvious – and non-obvious – safety concerns. The PRISM reactor is cooled by liquid sodium, which can very readily catch fire. They are kept as small reactors, to make it easier to maintain safety features.

Apart from the high costs of building these reactors, because they are small, they would not be economic to sell except in large numbers; they need to be pretty well mass produced to make them viable for export. Bearing in mind that they still exist only as blueprints — it will be a very long stretch until somebody (in Australia?) places an order for them in large numbers.

The Integral Fast Reactor is, after all, just another type of nuclear reactor — it runs on radioactive fuel, provides heat to make electricity and produces radioactive waste. It also uses reprocessed nuclear wastes for its fuel, therefore nuclear reprocessing plants would be needed. So far, all existing nuclear reprocessing has proved to be an expensive failure. For instance, the USA’s MOX reprocessing fuel plant is still under construction — it has cost billions of dollars, is over budget and also behind schedule. In Japan, the super expensive Monju prototype fast breeder reactor is costing 1,000 times more than conventional reactors to run.

Beyond all that, there is the safety factor, mentioned briefly before. The metal fuel gets hot and, unlike oxide based fuels, when it heats, it swells. If the fuel expands too much, it can crack the surrounding cladding — and that presents a big problem.

And just as safety impinges on costs, so does security. These small nuclear reactors have to be guarded, and so does the plutonium and enriched uranium fuel being transported to the reactor. And so do the eventual radioactive wastes produced by the IFRs. Security alone would be a huge expense — and more so because it would involve guarding not just a few big reactors, but a large number of small ones.

#### US decline will not spark wars.

MacDonald & Parent 11—Professor of Political Science at Williams College & Professor of Political Science at University of Miami [Paul K. MacDonald & Joseph M. Parent, “Graceful Decline? The Surprising Success of Great Power Retrenchment,” International Security, Vol. 35, No. 4 (Spring 2011), pp. 7–44]

Our findings are directly relevant to what appears to be an impending great power transition between China and the United States. Estimates of economic performance vary, but most observers expect Chinese GDP to surpass U.S. GDP sometime in the next decade or two. 91 This prospect has generated considerable concern. Many scholars foresee major conflict during a Sino-U.S. ordinal transition. Echoing Gilpin and Copeland, John Mearsheimer sees the crux of the issue as irreconcilable goals: China wants to be America’s superior and the United States wants no peer competitors. In his words, “[N]o amount of goodwill can ameliorate the intense security competition that sets in when an aspiring hegemon appears in Eurasia.” 92

Contrary to these predictions, our analysis suggests some grounds for optimism. Based on the historical track record of great powers facing acute relative decline, the United States should be able to retrench in the coming decades. In the next few years, the United States is ripe to overhaul its military, shift burdens to its allies, and work to decrease costly international commitments. It is likely to initiate and become embroiled in fewer militarized disputes than the average great power and to settle these disputes more amicably. Some might view this prospect with apprehension, fearing the steady erosion of U.S. credibility. Yet our analysis suggests that retrenchment need not signal weakness. Holding on to exposed and expensive commitments simply for the sake of one’s reputation is a greater geopolitical gamble than withdrawing to cheaper, more defensible frontiers.

Some observers might dispute our conclusions, arguing that hegemonic transitions are more conflict prone than other moments of acute relative decline. We counter that there are deductive and empirical reasons to doubt this argument. Theoretically, hegemonic powers should actually find it easier to manage acute relative decline. Fallen hegemons still have formidable capability, which threatens grave harm to any state that tries to cross them. Further, they are no longer the top target for balancing coalitions, and recovering hegemons may be influential because they can play a pivotal role in alliance formation. In addition, hegemonic powers, almost by definition, possess more extensive overseas commitments; they should be able to more readily identify and eliminate extraneous burdens without exposing vulnerabilities or exciting domestic populations.

We believe the empirical record supports these conclusions. In particular, periods of hegemonic transition do not appear more conflict prone than those of acute decline. The last reversal at the pinnacle of power was the AngloAmerican transition, which took place around 1872 and was resolved without armed confrontation. The tenor of that transition may have been influenced by a number of factors: both states were democratic maritime empires, the United States was slowly emerging from the Civil War, and Great Britain could likely coast on a large lead in domestic capital stock. Although China and the United States differ in regime type, similar factors may work to cushion the impending Sino-American transition. Both are large, relatively secure continental great powers, a fact that mitigates potential geopolitical competition. 93 China faces a variety of domestic political challenges, including strains among rival regions, which may complicate its ability to sustain its economic performance or engage in foreign policy adventurism. 94

Most important, the United States is not in free fall. Extrapolating the data into the future, we anticipate the United States will experience a “moderate” decline, losing from 2 to 4 percent of its share of great power GDP in the five years after being surpassed by China sometime in the next decade or two. 95 Given the relatively gradual rate of U.S. decline relative to China, the incentives for either side to run risks by courting conflict are minimal. The United States would still possess upwards of a third of the share of great power GDP, and would have little to gain from provoking a crisis over a peripheral issue. Conversely, China has few incentives to exploit U.S. weakness. 96 Given the importance of the U.S. market to the Chinese economy, in addition to the critical role played by the dollar as a global reserve currency, it is unclear how Beijing could hope to consolidate or expand its increasingly advantageous position through direct confrontation. In short, the United States should be able to reduce its foreign policy commitments in East Asia in the coming decades without inviting Chinese expansionism. Indeed, there is evidence that a policy of retrenchment could reap potential benefits. The drawdown and repositioning of U.S. troops in South Korea, for example, rather than fostering instability, has resulted in an improvement in the occasionally strained relationship between Washington and Seoul. 97 U.S. moderation on Taiwan, rather than encouraging hard-liners in Beijing, resulted in an improvement in cross-strait relations and reassured U.S. allies that Washington would not inadvertently drag them into a Sino-U.S. conflict. 98 Moreover, Washington’s support for the development of multilateral security institutions, rather than harming bilateral alliances, could work to enhance U.S. prestige while embedding China within a more transparent regional order. 99 A policy of gradual retrenchment need not undermine the credibility of U.S. alliance commitments or unleash destabilizing regional security dilemmas. Indeed, even if Beijing harbored revisionist intent, it is unclear that China will have the force projection capabilities necessary to take and hold additional territory. 100 By incrementally shifting burdens to regional allies and multilateral institutions, the United States can strengthen the credibility of its core commitments while accommodating the interests of a rising China. Not least among the benefits of retrenchment is that it helps alleviate an unsustainable financial position. Immense forward deployments will only exacerbate U.S. grand strategic problems and risk unnecessary clashes. 101

### 1NC—Waste

#### No terrorism

Mueller 6 (John, political science professor at Ohio State University, September/October. “Is There Still a Terrorist Threat?: The Myth of the Omnipresent Enemy.” Foreign Affairs.)

One reason al Qaeda and "al Qaeda types" seem not to be trying very hard to repeat 9/11 may be that that dramatic act of destruction itself proved counterproductive by massively heightening concerns about terrorism around the world. No matter how much they might disagree on other issues (most notably on the war in Iraq), there is a compelling incentive for states -- even ones such as Iran, Libya, Sudan, and Syria -- to cooperate in cracking down on al Qaeda, because they know that they could easily be among its victims. The FBI may not have uncovered much of anything within the United States since 9/11, but thousands of apparent terrorists have been rounded, or rolled, up overseas with U.S. aid and encouragement. Although some Arabs and Muslims took pleasure in the suffering inflicted on 9/11 -- Schadenfreude in German, shamateh in Arabic -- the most common response among jihadists and religious nationalists was a vehement rejection of al Qaeda's strategy and methods. When Soviet troops invaded Afghanistan in 1979, there were calls for jihad everywhere in Arab and Muslim lands, and tens of thousands flocked to the country to fight the invaders. In stark contrast, when the U.S. military invaded in 2001 to topple an Islamist regime, there was, as the political scientist Fawaz Gerges points out, a "deafening silence" from the Muslim world, and only a trickle of jihadists went to fight the Americans. Other jihadists publicly blamed al Qaeda for their post-9/11 problems and held the attacks to be shortsighted and hugely miscalculated. The post-9/11 willingness of governments around the world to take on international terrorists has been much reinforced and amplified by subsequent, if scattered, terrorist activity outside the United States. Thus, a terrorist bombing in Bali in 2002 galvanized the Indonesian government into action. Extensive arrests and convictions -- including of leaders who had previously enjoyed some degree of local fame and political popularity -- seem to have severely degraded the capacity of the chief jihadist group in Indonesia, Jemaah Islamiyah. After terrorists attacked Saudis in Saudi Arabia in 2003, that country, very much for self-interested reasons, became considerably more serious about dealing with domestic terrorism; it soon clamped down on radical clerics and preachers. Some rather inept terrorist bombings in Casablanca in 2003 inspired a similarly determined crackdown by Moroccan authorities. And the 2005 bombing in Jordan of a wedding at a hotel (an unbelievably stupid target for the terrorists) succeeded mainly in outraging the Jordanians: according to a Pew poll, the percentage of the population expressing a lot of confidence in bin Laden to "do the right thing" dropped from 25 percent to less than one percent after the attack.

#### No retaliation

Huddy et al. 5– Professor of political science @ Stony Brook University, Stony Brook, NY [Leonie Huddy, Stanley Feldman (Professor of political science @ Stony Brook University, Stony Brook, NY), Charles Taber (Professor of political science @ Stony Brook University, Stony Brook, NY) & Gallya Lahav (Professor of political science @ Stony Brook University, Stony Brook, NY), “Threat, Anxiety, and Support of Antiterrorism Policies,” American Journal of Political Science, Vol. 49, No. 3, July 2005, Pp. 593–608]

The findings from this study lend further insight into the future trajectory of support for antiterrorism measures in the United States when we consider the potential effects of anxiety. Security threats in this and other studies increase support for military action (Jentleson 1992; Jentleson and Britton 1998;Herrmann,Tetlock, and Visser 1999). But anxious respondents were less supportive of belligerent military action against terrorists, suggesting an important source of opposition to military intervention. In the aftermath of 9/11, several factors were consistently related to heightened levels of anxiety and related psychological reactions, including living close to the attack sites (Galea et al. 2002; Piotrkowski and Brannen 2002; Silver et al. 2002), and knowing someone who was hurt or killed in the attacks (in this study). It is difficult to say what might happen if the United States were attacked again in the near future. Based on our results, it is plausible that a future threat or actual attack directed at a different geographic region would broaden the number of individuals directly affected by terrorism and concomitantly raise levels of anxiety. This could, in turn, **lower support for overseas military action**. In contrast, in the absence of any additional attacks levels of anxiety are likely to decline slowly over time (we observed a slow decline in this study), weakening opposition to future overseas military action. Since our conclusions are based on analysis of reactions to a single event in a country that has rarely felt the effects of foreign terrorism, we should consider whether they can be generalized to reactions to other terrorist incidents or to reactions under conditions of sustained terrorist action. Our answer is a tentative yes, although there is no conclusive evidence on this point as yet. Some of our findings corroborate evidence from Israel, a country that has prolonged experience with terrorism. For example, Israeli researchers find that perceived risk leads to increased vilification of a threatening group and support for belligerent action (Arian 1989; Bar-Tal and Labin 2001). There is also evidence that Israelis experienced fear during the Gulf War, especially in Tel Aviv where scud missiles were aimed (Arian and Gordon 1993). What is missing, however, is any evidence that anxiety tends to undercut support for belligerent antiterrorism measures under conditions of sustained threat. For the most part, Israeli research has not examined the distinct political effects of anxiety. In conclusion, the findings from this study provide significant new evidence on the political effects of terrorism and psychological reactions to external threat more generally. Many terrorism researchers have speculated that acts of terrorist violence can arouse fear and anxiety in a targeted population, which lead to alienation and social and political dislocation.8 We have clear evidence that the September 11 attacks did induce anxiety in a sizeable minority of Americans. And these emotions were strongly associated with symptoms of depression, appeared to inhibit learning about world events, and weakened support foroverseas military action. This contrasted, however, with Americans’ dominant reaction, which was a heightened concern about future terrorist attacks in the United States that galvanized support for government antiterrorist policy. In this sense, the 9/11 terrorists failed to arouse sufficient levels of anxiety to counteract Americans’ basic desire to strike back in order to increase future national security, even if such action increased the shortterm risk of terrorism at home. Possible future acts of terrorism, or a different enemy, however, could change the fine balance between a public attuned to future risks and one dominated by anxiety.

### 1NC—Water Wars

#### No water wars—their ev is hype.

Katz 11—Lecturer of Geography and Environmental Studies @ University of Haifa [Dr. David Katz (PhD in Natural Resource Policy & MA in Applied Economics @ University of Michigan), “Hydro-Political Hyperbole: Examining Incentives for Overemphasizing the Risks of Water Wars,” Global Environmental Politics, Volume 11, Number 1, February 2011, pp. 12-35]

Evidence and Perception

In sum, despite some instances of violent conflict over water, there is little systematic evidence of war over water resources. Evidence for a deterministic relationship between water scarcity and the outbreak of armed conflict is particularly weak. Less ambitious claims that water shortages will contribute to insecurity, which can, in turn, lead to violent conflict, have more empirical support. Even here, however, the importance of water as a causal variable is questionable. Several studies have found that variables such as regime type and institutional capacity are much more important indicators of conflict potential, 43 and may have mitigating effects on any water-conflict link.

As a consequence of accumulated research, many scholars have concluded that risks of water wars are low, 44 and others have toned down or qualified their statements about the likelihood of future water wars.45 Some governmental reports have limited their contentions to highlighting that water scarcity can aggravate conflicts and increase insecurity,46 and many studies now emphasize water as a tool for cooperation.47 Warnings and predictions of imminent water wars continue to be commonplace, however. In a review of published academic literature, Gupta and van der Zaag find that articles on water conflict outnumber those on cooperation by nearly three to one, and are five times more likely to be cited.48

This article will now turn to offering possible explanations for the persistence and popularity of such declarations despite the bulk of expert opinion downplaying the risks of water wars.

Incentives to Stress a Water War Scenario

Incentives Presented in Existing Literature

Observers have noted that various actors may have incentives to stress or even exaggerate the risks of water wars. Lonergan notes, for instance, that in “many cases, the comments are little more than media hype; in others, statements have been made for political reasons.”49 Beyond mere acknowledgement of the possibility of such incentives, however, little research has attempted to understand what these incentives are and how they may differ between actors. An understanding of the different motivations of various groups of actors to stress the possibility of imminent water wars can help explain the continued seemingly disproportionate popularity of such messages and help to evaluate such warnings more critically.pg. 17-18 //1nc

#### No risk of Middle East war

Maloney and Takeyh 7—\*senior fellow for Middle East Policy at the Saban Center for Middle East Studies at the Brookings Institution AND \*\*senior fellow for Middle East Studies at the Council on Foreign Relations (Susan and Ray, International Herald Tribune, 6/28, “Why the Iraq War Won't Engulf the Mideast,”

http://www.brookings.edu/opinions/2007/0628iraq\_maloney.aspx)

Yet, the Saudis, Iranians, Jordanians, Syrians, and others are very unlikely to go to war either to protect their own sect or ethnic group or to prevent one country from gaining the upper hand in Iraq. The reasons are fairly straightforward. First, Middle Eastern leaders, like politicians everywhere, are primarily interested in one thing: self-preservation. Committing forces to Iraq is an inherently risky proposition///

, which, if the conflict went badly, could threaten domestic political stability. Moreover, most Arab armies are geared toward regime protection rather than projecting power and thus have little capability for sending troops to Iraq. Second, there is cause for concern about the so-called blowback scenario in which jihadis returning from Iraq destabilize their home countries, plunging the region into conflict. Middle Eastern leaders are preparing for this possibility. Unlike in the 1990s, when Arab fighters in the Afghan jihad against the Soviet Union returned to Algeria, Egypt and Saudi Arabia and became a source of instability, Arab security services are being vigilant about who is coming in and going from their countries. In the last month, the Saudi government has arrested approximately 200 people suspected of ties with militants. Riyadh is also building a 700 kilometer wall along part of its frontier with Iraq in order to keep militants out of the kingdom. Finally, there is no precedent for Arab leaders to commit forces to conflicts in which they are not directly involved. The Iraqis and the Saudis did send small contingents to fight the Israelis in 1948 and 1967, but they were either ineffective or never made it. In the 1970s and 1980s, Arab countries other than Syria, which had a compelling interest in establishing its hegemony over Lebanon, never committed forces either to protect the Lebanese from the Israelis or from other Lebanese. The civil war in Lebanon was regarded as someone else's fight. Indeed, this is the way many leaders view the current situation in Iraq. To Cairo, Amman and Riyadh, the situation in Iraq is worrisome, but in the end it is an Iraqi and American fight. As far as Iranian mullahs are concerned, they have long preferred to press their interests through proxies as opposed to direct engagement. At a time when Tehran has access and influence over powerful Shiite militias, a massive cross-border incursion is both unlikely and unnecessary. So Iraqis will remain locked in a sectarian and ethnic struggle that outside powers may abet, but will remain within the borders of Iraq. The Middle East is a region both prone and accustomed to civil wars. But given its experience with ambiguous conflicts, the region has also developed an intuitive ability to contain its civil strife and prevent local conflicts from enveloping the entire Middle East.

## \*\*\* 2NC

### o/v

#### Extinction

Hayes 10 Peter Hayes, \*Executive Director of the Nautilus Institute for Security and Sustainable Development, AND, Michael Hamel-Green, \*\* Executive Dean of the Faculty of Arts, Education and Human Development act Victoria University (1/5/10, Executive Dean at Victoria, “The Path Not Taken, the Way Still Open: Denuclearizing the Korean Peninsula and Northeast Asia,” http://www.nautilus.org/fora/security/10001HayesHamalGreen.pdf

But the catastrophe within the region would not be the only outcome. New research indicates that even a limited nuclear war in the region would rearrange our global climate far more quickly than global warming. Westberg draws attention to new studies modelling the effects of even a limited nuclear exchange involving approximately 100 Hiroshima-sized 15 kt bombs2 (by comparison it should be noted that the United States currently deploys warheads in the range 100 to 477 kt, that is, individual warheads equivalent in yield to a range of 6 to 32 Hiroshimas).The studies indicate that the soot from the fires produced would lead to a decrease in global temperature by 1.25 degrees Celsius for a period of 6-8 years.3 In Westberg’s view:  That is not global winter, but the nuclear darkness will cause a deeper drop in temperature than at any time during the last 1000 years. The temperature over the continents would decrease substantially more than the global average. A decrease in rainfall over the continents would also follow…The period of nuclear darkness will cause much greater decrease in grain production than 5% and it will continue for many years...hundreds of millions of people will die from hunger…To make matters even worse, such amounts of smoke injected into the stratosphere would cause a huge reduction in the Earth’s protective ozone.4 These, of course, are not the only consequences. Reactors might also be targeted, causing further mayhem and downwind radiation effects, superimposed on a smoking, radiating ruin left by nuclear next-use. Millions of refugees would flee the affected regions. The direct impacts, and the follow-on impacts on the global economy via ecological and food insecurity, could make the present global financial crisis pale by comparison. How the great powers, especially the nuclear weapons states respond to such a crisis, and in particular, whether nuclear weapons are used in response to nuclear first-use, could make or break the global non proliferation and disarmament regimes. There could be many unanticipated impacts on regional and global security relationships5, with subsequent nuclear breakout and geopolitical turbulence, including possible loss-of-control over fissile material or warheads in the chaos of nuclear war, and aftermath chain-reaction affects involving other potential proliferant states. The Korean nuclear proliferation issue is not just a regional threat but a global one that warrants priority consideration from the international community.

### Nuke Terrorism Turn

#### U.S. acceptance of reprocessing makes nuclear terrorism inevitable—our domestic policy sets the standard.

Gallucci, President of the MacArthur Foundation, 11—president of the John D. and Catherine T. MacArthur Foundation, previously, served as Dean of Georgetown University’s Edmund A. Walsh School of Foreign Service, served for 21 years with the U.S. Department of State as Ambassador at Large [June 9, 2011, Robert Gallucci, “Leadership and the Future of Nuclear Energy,” http://www.macfound.org/site/c.lkLXJ8MQKrH/b.4462613/apps/s/content.asp?ct=10875785]

Terrorism, on the other hand, poses a different kind of threat. The disaster at Fukushima could just as well have been the result of a deliberate attack. An attacker would only have needed to know the weaknesses in facility design and operation in order to put the fuel and reactor cores at risk. This logic also applies to theft and diversion.

For more than a decade, American presidents have said that the greatest threat confronting our country is that a terrorist will detonate a nuclear device in one of our cities.

Some say this is farfetched. I am convinced it is perfectly feasible, a risk low in probability but high in consequence.

Terrorists would have a hard time getting their hands on a ready-made nuclear weapon and would therefore more likely aim to build an improvised nuclear device (or IND). It would probably be a “gun-type device,” like the one dropped on Hiroshima. Making a plutonium bomb, like that dropped on Nagasaki, is far harder. But it would be a mistake to assume that terrorists would be unable to build a plutonium bomb – imperfect or inefficient as it might be by the standards of the designers at Livermore or Los Alamos.

The consequences of either device would be catastrophic. A bomb on the scale of Hiroshima could kill a quarter of a million people in a major city. A smaller device could kill tens of thousands over several weeks. The economic and political costs would be incalculable.

The biggest impediment to making a nuclear weapon is getting the fissile material, either highly enriched uranium or plutonium.

So our objective in addressing the security risks of nuclear power is simple: make sure that terrorists cannot get their hands on fissile material from the nuclear fuel cycle.

I would argue that we need to carefully control enrichment technology, because it can be used to produce HEU; and we need to stop the spread of reprocessing technology because it does produce plutonium.

There is a debate over whether spent fuel reprocessing is a prudent or irrational way to manage radioactive waste and conserve uranium, from both economic and technical points of view. I take the latter view.

My reasoning (I have discovered that foundations call this a "logic model"):

The more fissile material there is available, the more likely it is that an IND will be manufactured and an act of nuclear terrorism will occur.

If energy producers choose to recycle plutonium in thermal reactors, it will be impossible adequately to account for plutonium in the nuclear fuel cycle. The risk of theft or diversion would rise.

The introduction of mixed oxide (MOX) fuel into any country's nuclear fuel cycle increases the risk that plutonium will be acquired by a would-be nuclear terrorist.

So any nation thinking about recycling plutonium needs to be aware of, and take account of, the additional risk of nuclear terrorism.

In my view, there is nothing to be won by the introduction of plutonium fuels into the nuclear fuel cycle that is not substantially off-set by an increased risk to security.

If we eliminate the possibility of terrorists obtaining fissile material, we eliminate most of the risk of a nuclear terrorist attack.

So, as we think about the security risks and begin to assess how to minimize them going forward, our priority should be to end the recycle of plutonium and the use of mixed oxide fuel. If separated plutonium exists, it can be stolen from a storage or fuel-fabrication facility, a nuclear reactor, or in transport.

In my opinion there is no acceptable reprocessing technology – not COEX, not UREX+, not pyroprocessing. If a mixed oxide fuel can be used in a thermal reactor, it can also be used directly to make an improvised nuclear device, or be purified by a determined terrorist sufficiently to be used in such a device.

So I do not buy the arguments made for plutonium recycle in the U.S., China, India, the Republic of Korea, and beyond. The claim is that recycle would facilitate radioactive waste management, save uranium and SWUs, and prepare the way for fast reactors.

American proponents even argue it would help the U.S. regain technical credibility and international leadership in nuclear energy.

It is not at all clear that recycle will ease radioactive waste management. Indeed, it may well exacerbate the challenge. Moreover, safe spent-fuel storage is at hand in dry storage – local or off-site – good, arguably, for hundreds of years.

The economic arguments for recycle, which depend on the price of uranium and the cost of enrichment and reprocessing, are weak and have gotten weaker over time.

And the large scale adoption of fast reactors is hardly inevitable – or even likely for a very long time.

I have told the Blue Ribbon Commission, a U.S. panel investigating storage options for nuclear waste, that it is folly to argue for a recycle approach. It is politically risky, economically unwise, and technically unnecessary. The only remaining argument is that the U.S. needs to be an industry leader. But it is a poor leader that persuades others to go in precisely the wrong direction.

Instead, the U.S. should argue that the risks of plutonium recycle in thermal reactors are simply too great, and that no country, no matter how advanced, should follow that course. This is where the question of leadership comes in: it is vital that the U.S. get its policy right. If we do, we can credibly influence the rest of the world. If not, we have no credibility, and reduced leverage, in persuading China, Korea, Japan, and others not to recycle.

### 2NC UQ—U.S. Won’t Cave Now

#### US won’t cave to South Korea on reprocessing now

Yonhap, 3-8-2012, “U.S. unlikely to allow S. Korea to reprocess nuclear fuel,” http://english.yonhapnews.co.kr/national/2012/03/08/23/0301000000AEN20120308007100315F.HTML

The United States is unlikely to allow South Korea to adopt its indigenous technology aimed at reprocessing highly radioactive spent nuclear fuel in their negotiations to revise a bilateral nuclear accord, a senior Seoul diplomat involved in the talks said Thursday. The refusal by U.S. negotiators stemmed from a "deep-rooted distrust" of South Korea, which had once authorized a clandestine nuclear weapons program in the early 1970s under former president Park Jung-hee but shut it down under pressure from Washington, the diplomat said on the condition of anonymity. Rather than pressing the U.S. to allow South Korea to adopt the proliferation-resistant reprocessing technology, called "pyroprocessing," Seoul is focusing on revising the nuclear accord to make it easier to export nuclear power plants, the diplomat said.

### Brooks Indict

#### Brook is wrong about everything—IFRs don’t solve prolif and are decades away.

Green 9—Jim Green, B. Med. Sci. (Hons.), PhD in science and technology studies for his analysis of the Lucas Heights research reactor debates, National nuclear campaigner - Friends of the Earth, Australia [Nov 18, 2009, Letter published in The Advertiser responding to Barry Brook’s article “Follow Britain's lead on nuclear power,” http://foe.org.au/anti-nuclear/issues/nfc/power/ifrs]

BARRY Brook promotes what he optimistically labels "next generation'' reactors with old-style spin ("Follow Britain's lead on nuclear power'', The Advertiser, 10/11/09).

For example, he repeatedly has claimed the non-existent “integral fast reactors’’ he champions “cannot be used to generate weapons-grade material”. Unfortunately, that simply is not true. Worse still, Brook persists with that claim although he knows it has been contradicted by, among others, a scientist with hands-on experience working on a prototype integral fast reactor in the US.

Brook and other promoters of "next generation'' reactors have another credibility problem. They acknowledge the need for a rigorous safeguards system to prevent the use of peaceful nuclear facilities to produce weapons of mass destruction, and they acknowledge the existing safeguards fall well short of being rigorous.

None of them, however, is willing to get off his backside to support important, ongoing efforts to strengthen safeguards. This simply is irresponsible. Moreover, it is hypocritical for Brook to criticise Friends of the Earth and other groups which have worked long and hard to strengthen safeguards - with absolutely no help from such people as him.

Brook also berates Friends of the Earth for failing to acknowledge “technological developments that solve the long-lived nuclear waste problem”. Those developments, however, involve another non-existent technology, called pyroprocessing.

South Korea recently announced its intention to embark on a research and development program which aims to provide a “demonstration” of the viability of operating reactors in conjunction with pyroprocessing by the year 2028. That is almost 20 years - just to demonstrate the concept.

Brook offers nothing but false and extravagant claims based on non-existent technology. We deserve better.

### AT: Can’t Build a Bomb with Contaminated Pu

#### You can build a bomb with contaminated plutonium

Lochbaum 8—Dave Lochbaum, Director of the Nuclear Safety Project, UCS [June 2008, Review of: Tom Blees’ book: Prescription for the Planet The painless remedy for our energy & environmental crises, http://skirsch.com/politics/globalwarming/ifrUCSresponse.pdf]

Ed cites the work of Dr. Bruce Goodwin regarding the possibility of making nuclear weapons from plutonium combined with other materials. Ed cited the work of DOE’s Dr. E. Collins about the radioactive levels being about 100 times less than the standard established for self-protection. Thus, pyroprocessing does not equate to immunity from proliferation.

### 2NC Link—Plutonium

#### Even if IFRs don’t actually reprocess, even using them to eliminate plutonium stockpiles would be perceived as general US acceptance of ALL reprocessing

Ong 5—Carah Ong, Nuclear Age Peace Foundation’s Advocacy and Research Director, May 2005, “Reprocessing and Proliferation Dangers,” http://www.wagingpeace.org/articles/2005/05/00\_ong\_reprocessing-proliferation-dangers.pdf

Reprocessing is contrary to national and international efforts to prevent the proliferation of nuclear materials to other countries or terrorists that could use them to make nuclear weapons or “dirty bombs.” If the US pursues reprocessing, it will undermine international efforts to discourage other countries—including Iran and other states of proliferation concern—from building their own reprocessing and enrichment facilities. As a 1994 report by the National Academy of Sciences (NAS) states, “[P]olicymakers will have to take into account the fact that choosing to use weapons plutonium in reactors would be perceived by some as representing generalized U.S. approval of separated plutonium fuel cycles, thereby compromising the ability of the U.S. government to oppose such fuel cycles elsewhere.” 2 Reprocessing is the only way of producing plutonium for use in nuclear weapons. Now nuclear weapons states, India and Pakistan both pursued plutonium programs that they justified as a legitimate part of their civil nuclear programs. North Korea also claimed for years that its reprocessing plant at Yongbyon was intended to separate plutonium for use in Mixed Oxide fuel for civilian nuclear power reactors. Today, experts believe North Korea has enough plutonium for some six to eight nuclear warheads. At the end of 2003, the world’s stockpiles of separated civilian plutonium stood at 235 metric tons, enough to make some 30,000 nuclear weapons, each with the destructive power comparable to the Hiroshima and Nagasaki bombs. Despite assertions to the contrary, terrorists could use civil plutonium to make potent nuclear weapons with a destructive power equivalent to at least 1,000 tons of TNT. Respected voices within the UK have warned of the dangers from Britain’s growing stockpile of separated plutonium. Perhaps most notably, in 1998, Britain’s Royal Society warned that “the chance that the stocks of plutonium might, at some stage, be accessed for illicit weapons production is of extreme concern.” 3 As a Rand Corporation report states, “It is critical that countries pay attention to the proliferation threat from the civilian side if they want to maximize the non-proliferation value of dismantling U.S. nuclear weapons and those of the FSRs (former Soviet republics). If countries ignore the civilian threat, they can compound the problem by making wrong choices in how to deal with military materials.” 4 Reprocessing is not proliferation resistant. The US is currently researching and developing a technology known as Uranium Extraction Plus or UREX Plus. In a testimony on March 17, 2005 before the Energy and Water Appropriations Subcommittee, Bill Magwood, the Director of the Office of Nuclear Energy, Science and Technology at the US Department of Energy, stated, “One test that it [UREX Plus] has not yet passed is the proliferation resistance test.” In the same testimony, Magwood also stated, “[W]e're not sure that it's possible to use this chemical technology to separate the plutonium in combination with a few other things, in a fashion that will make it both proliferation resistant and economically viable.” Recommendation Taking into account the previous Bush administration’s decision to phase out reprocessing, rather than taking a do-as-I-say-not-as-I-do approach to managing nuclear materials, the US should take the lead in demonstrating to the world that nuclear materials can be safely managed without separating weapons-usable materials as a critical step in curtailing the spread of nuclear weapons.

### 2NC Link—Spillover

#### Even if they win their tech is prolif resistant, it still links—any perception of support for reprocessing will spillover to other tech, undermines US credibility, and builds international expertise that causes prolif

Cochran 4—Thomas B. Cochran, dir. Nuclear Program @ Nat. Resources Defense Council, 3-26-2004, “Critique of “The Future of Nuclear Power: An Interdisciplinary MIT Study””, http://www.c2es.org/docUploads/10-50\_Cochran.pdf

In addition, the MIT Study recognizes that the closed fuel cycle represents a serious proliferation threat when undertaken in any number of non-weapon states, e.g., Iraq, Iran, North Korea, and even Russia. Despite the acknowledgement of poor economic prospects, no significant waste management advantages and high proliferation risks associated with closed fuel cycles, the MIT Study unfortunately leaves the door open to develop new reprocessing technologies. On the other hand, we [the MIT Study group] support modest laboratory scale research and analysis on new separation methods with the objective to learn about separation methods that are less costly and more proliferation resistant. There has been little exploration in the United States of alternatives to PUREX and pyro-processing since their invention decades ago with entirely different purposes in mind: obtaining weapons usable material and reprocessing metal fuel, respectively. We note however that there is considerable skepticism for even this modest approach, because some see any U.S. work on reprocessing sending the wrong signal to other nations about the credibility of our expressed attitude toward the proliferation risks of reprocessing, and the concern that DOE will move from analysis and research to development before the technical basis for such action has been developed. We propose that this program begin at a modest scale, reaching $10 million per year in about five years. (MIT Study, p. 92) Instead of curbing DOE’s appetite for promoting technologies that are both dangerous and uneconomical, this MIT Study recommendation likely will be used by DOE to justify its Advanced Fuel Cycle Initiative (AFCI). The DOE FY 2004 budget for the AFCI is $63 million—over six times what the MIT recommends be spent in five years. The AFCI is coordinated with DOE’s Generation IV program to develop new reactor concepts for possible introduction in the 2030 to 2050 time period. Last year DOE organized the Generation-IV International Forum, an effort by 10 countries to jointly develop six nuclear energy systems, including several fast reactor concepts that require closed fuel cycles. The countries included five non-weapon states that formerly had clandestine nuclear weapon programs, namely, South Africa, Argentina, Brazil, South Korea and Switzerland. Although the MIT Study recommends that “[t]he DOE R&D program should be realigned to focus on the open, once-through fuel cycle” (MIT Study, p. x), I fear the recommendation to engage in modest R&D on closed fuel cycles will be used to bolster the DOE AFCI effort. This will promote in non-weapon states, including states that in the past had clandestine nuclear weapon programs, the construction of hot cells for reprocessing R&D and training of cadres of experts in plutonium chemistry and metallurgy. This DOE effort is clearly a threat to U.S. national security. Because closed fuel cycles are so uneconomical, U.S. government sponsored research on closed fuel cycles is not likely to lead to their adoption. Consequently, in the next fifty years I believe U.S. nuclear plants will stick with the open fuel cycle.

### 2NC—Bias

#### Discard hyperbolic language—empirics prove industry promises are fantasies.

Green 9—Jim Green, B. Med. Sci. (Hons.), PhD in science and technology studies for his analysis of the Lucas Heights research reactor debates, National nuclear campaigner - Friends of the Earth, Australia [August 1, 2009, “Nuclear Weapons and 'Fourth Generation' Nuclear Power,” http://www.energybulletin.net/49949]

In addition to dishonest or ill-informed claims that 'fourth generation' nuclear power will satisfactorily address WMD proliferation concerns, its proponents also claim that it will be safe, cheap, simple, flexible etc.

Amory Lovins from the Rocky Mountain Institute has summarised the differences between real and make-believe nuclear reactors:

"An academic reactor or reactor plant almost always has the following basic characteristics: (1) It is simple. (2) It is small. (3) It is cheap. (4) It is light. (5) It can be built very quickly. (6) It is very flexible in purpose. (7) Very little development will be required. It will use off the shelf components. (8) The reactor is in the study phase. It is not being built now.

"On the other hand a practical reactor can be distinguished by the following characteristics: (1) It is being built now. (2) It is behind schedule. (3) It requires an immense amount of development on apparently trivial items. (4) It is very expensive. (5) It takes a long time to build because of its engineering development problems. (6) It is large. (7) It is heavy. (8) It is complicated.

"Every new type of reactor in history has been costlier, slower, and harder than projected. ...

"In short, the notion that different or smaller reactors plus wholly new fuel cycles (and, usually, new competitive conditions and political systems) could overcome nuclear energy's inherent problems is not just decades too late, but fundamentally a fantasy. Fantasies are all right, but people should pay for their own. Investors in and advocates of small-reactor innovations will be disappointed. But in due course, the aging advocates of the half-century-old reactor concepts that never made it to market will retire and die, their credulous young devotees will relearn painful lessons lately forgotten, and the whole nuclear business will complete its slow death of an incurable attack of market forces."

### Ext Katz—Hype

#### 4. Their authors are academic opportunists—can’t trust their research.

Katz 11—Lecturer of Geography and Environmental Studies @ University of Haifa [Dr. David Katz (PhD in Natural Resource Policy & MA in Applied Economics @ University of Michigan), “Hydro-Political Hyperbole: Examining Incentives for Overemphasizing the Risks of Water Wars,” Global Environmental Politics, Volume 11, Number 1, February 2011, pp. 12-35]

Raise the Profile of the Author or Organization: Similar to the desire to draw attention to a cause, framing water issues in a security context can be a means of raising the profile of an organization or author. Again, this incentive is probably most dramatic for NGOs. Many observers have noted that NGOs and other“non-elites” can face serious challenges in attracting attention. Some have resorted to “exceptionally strange or violent acts as a substitute for their lack of status or resources” in order to attract the media’s eye.63 However, as some have noted, while “the benefit of outlandish behavior is media attention, the price is that you get stuck in this role or caricaturization.”64 In order for their organization and message to be taken more seriously, many environmental organizations have moved away from such tactics.65 Increasing the severity of their message is one tactic to attract attention while toning down behavior.

In the case of academics, connecting water to security also offers researchers a way to raise the profile of their work, given the salience of security issues in high-level policy circles and with the general public. Doing so increases the potential to gain access to policy-makers and the media. There is some evidence that water research stressing conflict potential may be more likely to be published. 66 Furthermore, combining environmental and security issues expands the number and types of journals in which academics can publish. Moreover, by gaining exposure to audiences outside their particular field of expertise, researchers also expand possibilities for further research collaboration. Pg. 22

#### 5. They are driven by the desire for research funding.

Katz 11—Lecturer of Geography and Environmental Studies @ University of Haifa [Dr. David Katz (PhD in Natural Resource Policy & MA in Applied Economics @ University of Michigan), “Hydro-Political Hyperbole: Examining Incentives for Overemphasizing the Risks of Water Wars,” Global Environmental Politics, Volume 11, Number 1, February 2011, pp. 12-35

Other types of actors also face financial incentives to stress risks of water wars. Many NGOs are engaged in a constant search for funding, as are many academics. Both NGOs and academics with a focus on environmental, development, or security stand to benefit by expanding their focus to include some aspect of environmental security, as adding additional fields increases the pools of funding available. This is especially true for those adding the security element to their core focus, given the large pools of funding frequently available for security issues. In addition, many NGOs use press coverage as evidence of their effectiveness in awareness-raising vis-à-vis current and future sources of funding. As already mentioned, stressing war can increase the likelihood of media exposure. Pg. 22-23

#### 6. Their impact claims are political hype—they are solely for the purpose of attracting attention.

Katz 11—Lecturer of Geography and Environmental Studies @ University of Haifa [Dr. David Katz (PhD in Natural Resource Policy & MA in Applied Economics @ University of Michigan), “Hydro-Political Hyperbole: Examining Incentives for Overemphasizing the Risks of Water Wars,” Global Environmental Politics, Volume 11, Number 1, February 2011, pp. 12-35

Raise the Profile of Water-related Development or Environmental Needs: Several observers have noted that the process of securitization of issues is a strategic practice done in a conscious way to achieve specific goals, which need not be security-related.54 Griffiths noted that “the rhetoric of security is used to attract attention to new concerns.”55 A desire to bring attention to aspects of water management that may otherwise be deemed as less deserving of attention or funding is an incentive common to all actors examined in this study. Raising the specter of war can draw attention to issues such as inequitable allocation, sanitation, pollution, or other environmental or development concerns that may not otherwise be on many people’s political agendas. By tying their primary cause to conflict over water, actors increase their visibility and offer those who sympathize with their mission an additional reason to offer support or take action. Of the actors discussed herein, NGOs, which often have public education and awareness-raising as goals, face perhaps the strongest incentive to emphasize the risks of water wars in order to raise the profile of water-related development or environmental goals they are championing. On the first page of a report on improving access to water in poor communities, for instance, the NGO CARE, an organization dedicated to “fighting global poverty,”56 states in bold letters that “conflicts over water are predicted to contribute to most wars in the future.”57 The British-based NGO World Development Movement provocatively named its water campaign “Stop Water Wars,” though the primary goals of the campaign are advocacy in support of provision of basic water and sanitation services to the poor and opposition to privatization of the water industry.58

Other actors also may highlight the risks of water wars in order to bring attention to other environmental goals. Several books and articles have the phrase “water war” in the title, although actual discussion of violent conflict over water represents a relatively minor focus of the texts, with the bulk being dedicated to various water management issues.59 The intent of such works appears to be an effort to raise attention to some aspect of water management. Risk of violent conflict is used as a motivational device to highlight the potential dangers of failing to take action.

Policy-makers, too, may attempt to “securitize” water in order to bring attention to water management issues. For instance, former US Senator Paul Simon warns of water wars in a book on water policy.60 British diplomat John Ashton, the United Kingdom’s “Climate Ambassador,” reportedly said that global warming should be recast as a security issue to help mobilize support for cuts in global greenhouse gas emissions.61 While the previous comment addressed climate change in general rather than water shortages specifically, such a rationale seems reasonable in explaining declarations concerning water wars made by other officials in government and at bodies such as UNDP and UNESCO, which are formally charged with development and educational issues, not conflict resolution, and which make such declarations in reports that primarily focus on other aspects of water or environmental management.62 pg. 21-22

#### 7. War is not cost competitive

Wolf 98—Professor of geography @ Oregon State University and the director of the Transboundary Freshwater Dispute Database [Aaron T. Wolf, “Conflict and cooperation along international waterways,” Water Policy 1 (1998) pg. 251-265

It is tempting to add an economic argument against water wars. Water is neither a particularly costly commodity nor, given the financial resources to treat, store and deliver it, is it particularly scarce. Full-scale warfare, on the other hand, is tremendously expensive. A water war simply would not cost out.

This point was probably best made by the Israeli defense forces analyst, responsible for long-term planning during the 1982 invasion of Lebanon. When asked whether water was a factor in decision-making, he noted, ``Why go to war over water? For the price of one week's fighting, you could build five desalination plants. No loss of life, no international pressure and a reliable supply you don't have to defend in hostile territory'' (cited in Wolf,1995b).

To make such a case convincingly, though, one would have to show times when war was cost-effective and, if such a thing is possible, it is well-beyond the scope of this paper. Pg. 260-261

### Specific impact D

#### No risk of Middle East war

Maloney and Takeyh 7—\*senior fellow for Middle East Policy at the Saban Center for Middle East Studies at the Brookings Institution AND \*\*senior fellow for Middle East Studies at the Council on Foreign Relations (Susan and Ray, International Herald Tribune, 6/28, “Why the Iraq War Won't Engulf the Mideast,”

http://www.brookings.edu/opinions/2007/0628iraq\_maloney.aspx)

Yet, the Saudis, Iranians, Jordanians, Syrians, and others are very unlikely to go to war either to protect their own sect or ethnic group or to prevent one country from gaining the upper hand in Iraq. The reasons are fairly straightforward. First, Middle Eastern leaders, like politicians everywhere, are primarily interested in one thing: self-preservation. Committing forces to Iraq is an inherently risky proposition///

, which, if the conflict went badly, could threaten domestic political stability. Moreover, most Arab armies are geared toward regime protection rather than projecting power and thus have little capability for sending troops to Iraq. Second, there is cause for concern about the so-called blowback scenario in which jihadis returning from Iraq destabilize their home countries, plunging the region into conflict. Middle Eastern leaders are preparing for this possibility. Unlike in the 1990s, when Arab fighters in the Afghan jihad against the Soviet Union returned to Algeria, Egypt and Saudi Arabia and became a source of instability, Arab security services are being vigilant about who is coming in and going from their countries. In the last month, the Saudi government has arrested approximately 200 people suspected of ties with militants. Riyadh is also building a 700 kilometer wall along part of its frontier with Iraq in order to keep militants out of the kingdom. Finally, there is no precedent for Arab leaders to commit forces to conflicts in which they are not directly involved. The Iraqis and the Saudis did send small contingents to fight the Israelis in 1948 and 1967, but they were either ineffective or never made it. In the 1970s and 1980s, Arab countries other than Syria, which had a compelling interest in establishing its hegemony over Lebanon, never committed forces either to protect the Lebanese from the Israelis or from other Lebanese. The civil war in Lebanon was regarded as someone else's fight. Indeed, this is the way many leaders view the current situation in Iraq. To Cairo, Amman and Riyadh, the situation in Iraq is worrisome, but in the end it is an Iraqi and American fight. As far as Iranian mullahs are concerned, they have long preferred to press their interests through proxies as opposed to direct engagement. At a time when Tehran has access and influence over powerful Shiite militias, a massive cross-border incursion is both unlikely and unnecessary. So Iraqis will remain locked in a sectarian and ethnic struggle that outside powers may abet, but will remain within the borders of Iraq. The Middle East is a region both prone and accustomed to civil wars. But given its experience with ambiguous conflicts, the region has also developed an intuitive ability to contain its civil strife and prevent local conflicts from enveloping the entire Middle East.

#### Aff can’t solve—Indian dams makes war and collapse inevitable—aff doesn’t solve because desal doesn’t solve territory issues and no salt water to desalinate

Daly 12—John C.K. Daly is the chief analyst at the energy news site Oilprice.com. Dr. Daly received his Ph.D. in 1986 from the School of Slavonic and East European Studies, University of London [April 13, 2012, “Troubled Waters: Has The India-Pakistan Water Conflict Reached A Boiling Point?” http://www.economywatch.com/economy-business-and-finance-news/has-the-india-pakistan-water-conflict-reached-a-boiling-point.13-04.html]

In an editorial entitled “War With India Inevitable” published in Lahore's ‘The Nation’ on Sunday, the newspaper's Editor-in-Chief and Nazaria-i-Pakistan Trust Chairman, Majid Nizami, asked his fellow citizens to prepare for a war with India over water issues.

Nizami also told those attending the "Pakistan-India relations: Our rulers’ new wishes" session at Aiwan-e-Karkunan Tehrik-e-Pakistan, that, "Indian hostilities and conspiracies against the country will never end until she is taught a lesson."

While The Nation – a conservative daily that is part of the Nawa-i-Waqt publishing group – may have a circulation of just 20,000 readers, its close ties to Pakistan's highest military circles mean that Nizami's comments should hardly be rejected out of hand.

Tellingly, Nizami's audience at the session also included some high ranking Pakistani officials, including Nazaria-i-Pakistan Vice Chairman Dr Rafique Ahmed; Pakistan Movement Workers-Trust Chairman, retired Colonel Jamshed Ahmed Tareen; former Foreign Secretary Shamshad Ahmed Khan; Jamiat Ulema-e-Pakistan Secretary General Qari Zawar Bahadur; retired Air Marshall Khurished Anwar Mirza; retired Brigadier Hamid Saeed Akhtar and Jamaat-e-Islami Lahore Chief Ameer-ul-Azeem, among others.

At the heart of the issue are Pakistan's concerns over India's ongoing construction of two hydroelectric dams on the upper reaches of the Indus River. The Indus, which begins in Indian-controlled Kashmir and flows through both India and Pakistan, is Pakistan's primary freshwater source, on which 90 percent of its agriculture depends.

The 45-megawatt, 190-feet tall Nimoo-Bazgo concrete dam and the 44-megawatt Chutak hydroelectric power project, Islamabad believes, will reduce the Indus River's flow towards Pakistan, and are capable of storing up to 4.23 billion cubic feet of water, which will violate the terms of the bilateral 1960 Indus Water Treaty.

“Already the Indus is experiencing water flows that are down 30 percent from its normal levels. According to a number of Pakistani agriculture and water experts, the nation is heading towards a massive water shortage in the next couple of years due to insufficient water management practices and storage capacity, which will be exacerbated by the twin Indian hydroelectric projects.”

So, if push comes to shove, who's got Pakistan's back? China.

During the Boao Forum for Asia held in China's southern Hainan Island on 1 April, Pakistan and China agreed to support each other "in all circumstances" and vowed to uphold their sovereignty and territorial integrity at all costs.

Pakistani Prime Minister Syed Yousuf Raza Gilani told Chinese Executive Vice Premier Li Keqiang: "China's friend is our friend, and China's enemy is ours," adding that Pakistan considers China's security as its own security and supports China's position on Taiwan, Tibet and Xinjiang.

Li replied that China would support Pakistan's sovereignty and territorial integrity in every situation, telling Gilani: "No matter what changes take place at international level, we will uphold Pakistan's sovereignty and territorial integrity."

It might be noted here that in October 1962, coinciding with the Cuban missile crisis, India and China fought a brief but bitter war along their disputed Himalayan border. Fifty years later, China and India have yet to resolve their border issues over Kashmir; and China continues to claim most of India's Arunachal Pradesh territory to the base of the Himalayas in the absence of any definitive treaty delineating the border.

Kashmir today also remains the site of the world's largest and most militarized territorial dispute with portions under the de facto administration of China (Aksai Chin), India (Jammu and Kashmir), and Pakistan (Azad Kashmir and Northern Areas).

No guesses therefore as to whom Beijing might back should Pakistani-Indian tensions continue to rise.

Accordingly, the only way to keep the peace may be, as to paraphrase Ronald Reagan in Berlin: "Prime Minister Singh, tear down those dams!" Just don't bet on it.

### 2NC—Timeframe

#### IFRs decades away and sodium fires gut long term solvency—means they collapse the domestic industry and it takes them decades to catch up with china which triggers their impact

Clarke 10—Renfrey Clarke is an Australian writer, a climate change activist, and member of the Socialist Alliance in Adelaide, South Australia [April 8, 2010, “Why James Hansen is wrong on nuclear power,” International Journal of Socialist Renewal, http://links.org.au/node/1607]

Developing workable IFRs would not be straightforward or quick, even if massive resources were assigned to the task. Since the 1950s nuclear engineers have acquired considerable experience of fast-neutron reactors. Mostly, this experience has been with so-called “fast breeder” reactors, designed to maximise plutonium output for bomb making and reactor fuel, rather than with “burner” reactors like IFRs. But the message is the same for both types: fast-neutron reactors are particularly complex, have a high rate of accidents and breakdowns, and are fiendishly difficult and time consuming to service and repair.

Needing to maintain high neutron energy levels, fast reactors cannot use water as a coolant, since this would slow the neutrons down. The coolant of choice is molten sodium metal. Sodium is highly reactive, burning readily in air and exploding on contact with water. If leaks are not to result in sodium-air fires, the reactor vessel and coolant pipes must be surrounded with inert argon gas, adding to complexity and costs. At a certain point, the sodium coolant must be used for steam generation; here, it is separated from high-pressure water by only a thin barrier of pipe metal, any flaw in which can have drastic consequences.

The sodium that passes through the reactor core becomes highly radioactive. This means that an extra coolant loop must be incorporated, isolating the reactor coolant from the steam-generating equipment so that an explosion cannot disperse radioactive sodium; again, the additional complexity raises capital costs. For various repair and maintenance procedures, the sodium must be drained and the pipes flushed. This has to be done with regard for the radioactivity, while taking care to prevent fires. Even minor malfunctions can result in months of down time.

Sodium fires

Between 1980 and 1997, Russia’s BN-600 fast reactor experienced 27 leaks, 14 of which resulted in sodium fires. Japan’s Monju reactor suffered a major sodium-air fire in 1995, and was still out of action at the end of 2009. The only attempt so far at a commercial-scale fast reactor, the French Superphénix plant, was shut down after a decade in 1996; it had a lifetime capacity factor – that is, actual as compared to designed output – of just 7 per cent.

The development of IFRs, if it goes ahead, will be expensive, difficult and prolonged. Wikipedia predicts a commercialisation date for fourth-generation nuclear plants of 2030. But we cannot wait that long before drastically curtailing greenhouse emissions.

#### Default neg—overwhelming empirics and the world’s leading nuclear tech developers vote neg.

Lovins 9—Amory B. Lovins is a physicist and Cofounder, Chairman, and Chief Scientist of Rocky Mountain Institute and Cofounder and Chairman Emeritus of Fiberforge, Inc. Published in 29 books and hundreds of papers. He has consulted for more than three decades for major firms and governments (including the U.S. DoE and DOD) on advanced energy and resource efficiency in ~50 countries. [March 21, 2009, ““New” nuclear reactors, same old story,” Rocky Mountain Institute, http://www.rmi.org/Knowledge-Center/Library/2009-07\_NuclearSameOldStory]

IFRs might in principle offer some safety advantages over today’s light-water reactors, but create different safety concerns, including the sodium coolant’s chemical reactivity and radioactivity. Over the past half-century, the world’s leading nuclear technologists have built about three dozen sodium-cooled fast reactors, 11 of them Naval. Of the 22 whose histories are mostly reported, over half had sodium leaks, four suffered fuel damage (including two partial meltdowns), several others had serious accidents, most were prematurely closed, and only six succeeded. Admiral Rickover canceled sodium-cooled propulsion for USS Seawolf in 1956 as “expensive to build, complex to operate, susceptible to prolonged shutdown as a result of even minor malfunctions, and difficult and time-consuming to repair.” Little has changed. As Dr. Tom Cochran of NRDC notes, fast reactor programs were tried in the US, UK, France, Germany, Italy, Japan, the USSR///

, and the US and Soviet Navies. All failed. After a half-century and tens of billions of dollars, the world has one operational commercial-sized fast reactor (Russia’s BN600) out of 438 commercial power reactors, and it’s not fueled with plutonium.

### 2NC—No Transition Impact

#### The only comprehensive study proves no transition impact.

MacDonald & Parent 11—Professor of Political Science at Williams College & Professor of Political Science at University of Miami [Paul K. MacDonald & Joseph M. Parent, “Graceful Decline? The Surprising Success of Great Power Retrenchment,” International Security, Vol. 35, No. 4 (Spring 2011), pp. 7–44]

In this article, we question the logic and evidence of the retrenchment pessimists. To date there has been neither a comprehensive study of great power retrenchment nor a study that lays out the case for retrenchment as a practical or probable policy. This article fills these gaps by systematically examining the relationship between acute relative decline and the responses of great powers. We examine eighteen cases of acute relative decline since 1870 and advance three main arguments.

First, we challenge the retrenchment pessimists’ claim that domestic or international constraints inhibit the ability of declining great powers to retrench. In fact, when states fall in the hierarchy of great powers, peaceful retrenchment is the most common response, even over short time spans. Based on the empirical record, we find that great powers retrenched in no less than eleven and no more than fifteen of the eighteen cases, a range of 61–83 percent. When international conditions demand it, states renounce risky ties, increase reliance on allies or adversaries, draw down their military obligations, and impose adjustments on domestic populations.

Second, we find that the magnitude of relative decline helps explain the extent of great power retrenchment. Following the dictates of neorealist theory, great powers retrench for the same reason they expand: the rigors of great power politics compel them to do so.12 Retrenchment is by no means easy, but necessity is the mother of invention, and declining great powers face powerful incentives to contract their interests in a prompt and proportionate manner. Knowing only a state’s rate of relative economic decline explains its corresponding degree of retrenchment in as much as 61 percent of the cases we examined.

Third, we argue that the rate of decline helps explain what forms great power retrenchment will take. How fast great powers fall contributes to whether these retrenching states will internally reform, seek new allies or rely more heavily on old ones, and make diplomatic overtures to enemies. Further, our analysis suggests that great powers facing acute decline are less likely to initiate or escalate militarized interstate disputes. Faced with diminishing resources, great powers moderate their foreign policy ambitions and offer concessions in areas of lesser strategic value. Contrary to the pessimistic conclusions of critics, retrenchment neither requires aggression nor invites predation. Great powers are able to rebalance their commitments through compromise, rather than conflict. In these ways, states respond to penury the same way they do to plenty: they seek to adopt policies that maximize security given available means. Far from being a hazardous policy, retrenchment can be successful. States that retrench often regain their position in the hierarchy of great powers. Of the fifteen great powers that adopted retrenchment in response to acute relative decline, 40 percent managed to recover their ordinal rank. In contrast, none of the declining powers that failed to retrench recovered their relative position. Pg. 9-10

### Competitiveness

#### No impact to rising China

Goldsten 12 [Joshua S. Goldstein is professor emeritus at the School of International Service at American University. “Great-Power War to 2030”. http://gt2030.com/2012/08/16/great-power-war-to-2030/]

Certainly if the trends of recent decades continue, the coming decades will be more peaceful. But that’s an “if.” There’s no guarantee that recent trends will continue. Nonetheless, by recognizing recent trends away from war we can craft policies based on past successes, such as increasing support for the United Nations.

I’d like to address one common fear about war in the coming decades – the rise of China relative to the United States. Political scientist and leading “realist” John Mearsheimer (2010: 382) has written that “to put it bluntly: China cannot rise peacefully.” My view, by contrast, is that a great-power war involving China is possible alright, but not inevitable and actually not even that likely.

Must a rising China inevitably come to blows with the United States as the former hegemonic power in decline? The analogy is to the rise of Germany and the challenge it posed to Britain before the World Wars. But China, unlike 19th-century Germany, follows a “peaceful rise” strategy and has not fought a single military battle in 25 years (the only permanent UN Security Council member in that category). Also Germany felt denied its due status in the international system, as it came late to the colonial game and had few overseas possessions. But China has its due status as a permanent veto-wielding member of the UNSC, thanks to the foresight of Franklin D. Roosevelt in the creation of the UN, back when China’s power was anything but great.

China’s leaders stay in power by delivering economic prosperity based on international trade. A future war against the United States or another great power would wreck the pursuit of this trade-based wealth. That would be irrational on the part of China’s leadership, which has so far proven both peaceful and generally rather cautious in world affairs. Given that a great-power war in the nuclear age would be absolutely catastrophic for the participants, one would have to assume a level of craziness or stupidity from China’s leaders that completely departs from their behavior in recent decades. They may be exasperating as negotiating partners, or brutal as human-rights abusers, but they are not crazy.

## \*\*\* 1NR

### CP solves Waste

#### Propulsion technology is viable and cost effective

**Patel 11**—Prachi Patel, Astrobiology Magazine, Internally Qualified, 1/21/2011 ("Laser Propulsion Could Beam Rockets into Space," Space.com, Accessed online at http://www.space.com/10658-laser-rocket-propulsion-technology.html, Accessed on 9/6/11)

Space launches have evoked the same image for decades: bright orange flames exploding beneath a rocket as it lifts, hovers and takes off into the sky. But an alternative propulsion system proposed by some researchers could change that vision. Instead of explosive chemical reactions onboard a rocket, the new concept, called beamed thermal propulsion, involves propelling a rocket by shining laser light or microwaves at it from the ground. The technology would make possible a reusable single-stage rocket that has two to five times more payload space than conventional rockets, which would cut the cost of sending payloads into low-Earth orbit. NASA is now conducting a study to examine the possibility of using beamed energy propulsion for space launches. The study is expected to conclude by March 2011. In a traditional chemical rocket propulsion system, fuel and oxidizer are pumped into the combustion chamber under high pressure and burnt, which creates exhaust gases that are ejected down from a nozzle at high velocity, thrusting the rocket upwards. A beamed thermal propulsion system would involve focusing microwave or laser beams on a heat exchanger aboard the rocket. The heat exchanger would transfer the radiation's energy to the liquid propellant, most likely hydrogen, converting it into a hot gas that is pushed out of the nozzle. "The basic idea is to build rockets that leave their energy source on the ground," says Jordin Kare, president of Kare Technical Consulting, who developed the laser thermal launch system concept in 1991. "You transmit the energy from the ground to the vehicle." With the beam shining on the vehicle continually, it would take 8 to 10 minutes for a laser to put a craft into orbit, while microwaves would do the trick in 3 to 4 minutes. The vehicle would have to be designed without shiny surfaces that could reflect dangerous beams, and aircraft and satellites would have to be kept out of the beam's path. Any launch system would be built in high-altitude desert areas, so danger to wildlife shouldn't be a concern, Kare says. Thermal propulsion vehicles would be safer than chemical rockets since they can't explode and don't drop off pieces as they fly. They are also smaller and lighter because most of the complexity is on the ground, which makes them easier and cheaper to launch. "People can launch small satellites for education, science experiments, engineering tests, etc. whenever they want, instead of having to wait for a chance to share a ride with a large satellite," Kare says. Another cost advantage comes from larger payload space. While conventional propulsion systems are limited by the amount of chemical energy in the propellant that's released by combustion, in beamed systems you can add more energy externally. That means a spacecraft can gain a certain momentum using less than half the amount of propellant of a conventional system, allowing more room for the payload. "Usually in a conventional rocket you have to have three stages with a payload fraction of three percent overall," says Kevin Parkin, leader of the Microwave Thermal Rocket project at the NASA Ames Research Center. "This propulsion system will be single stage with a payload fraction of five to fifteen percent." Having a higher payload space along with a reusable rocket could make beamed thermal propulsion a low-cost way to get material into low Earth orbit, Parkin says. Parkin developed the idea of microwave thermal propulsion in 2001 and described a laboratory prototype in his 2006 Ph.D. thesis. A practical real-world system should be possible to build now because microwave sources called gyrotrons have transformed in the last five decades, he says. One megawatt devices are now on the market for about a million U.S. dollars. "They're going up in power and down in cost by orders of magnitude over the last few decades," he says. "We've reached a point where you can combine about a hundred and make a launch system." Meanwhile, the biggest obstacle to using lasers to beam energy has been the misconception that it would require a very large, expensive laser, Kare says. But you could buy commercially available lasers that fit on a shipping container and build an array of a few hundred. "Each would have its own telescope and pointing system," he says. "The array would cover an area about the size of a golf course." The smallest real laser launch system would have 25 to 100 megawatts of power while a microwave system would have 100 to 200 megawatts. Building such an array would be expensive, says Kare, although similar to or even less expensive than developing and testing a chemical rocket. The system would make most economic sense if it was used for at least a few hundred launches a year. In addition, says Parkin, "the main components of the beam facility should last for well over ten thousand hours of operation, typical of this class of hardware, so the savings can more than repay the initial cost." In the near term, beamed energy propulsion would be useful for putting microsatellites into low Earth orbit, for altitude changes or for slowing down spacecraft as they descend to Earth. But the technology could in the future be used to send missions to the Moon or to other planets and for space tourism.

#### Laser propulsion technology is effective, safe, and cheaper than geological disposal.

**Kare**, PhD in Astrophysics, **90** [Jordin T. Kare, “GROUND-TO-ORBITLASER PROPULSION ADVANCED APPLICATIONS” www.osti.gov/bridge/servlets/purl/6203669-Uxrfwv/6203669.pdf]

Unlike weight- and volume-limited conventional systems, a laser launcher could potentially handle unprocessed or minimally-processed waste. This minimizes boda radiation and toxic chemical hazards on the ground, and is therefore crucial to an economical system. A laser system could even be cheaper than geological disposal, because there would be less handling (separation, glassification) of waste. Lasers can launch waste directly to any desirable disposal site -- the Lunar surface, interplanetary space, or deep space (solar escape). The required delta-V's are roughly 11 to 15 km/s, beyond the capability of any single-stage chemical rocket or proposed cannon launcher. Laser propulsion could even launch payloads directly into the Sun, at 30 km/s delta-V. The precision guidance and flexible launch direction of a laser system could allow dumping payloads into, e.g., a selected lunar crater, for future recovery if desired. Very small laser propulsion payloads could present problems of shielding (to protect both launch-site workers and possible crash site bystanders) and safe any-angle reentry [11]. However, some problems of laser propulsion, such as launch delays due to weatller, are not important as long as the total mass launched is constant and the reliability is high.

### CP solves Competiveness

#### Their author votes neg

**Cullinane 11** [SCOTT CULLINANE 28 SEPTEMBER 2011 America Falling Behind: The Strategic Dimensions of Chinese Commercial Nuclear Energy http://www.ensec.org/index.php?option=com\_content%26view=article%26id=319:america-falling-behind-the-strategic-dimensions-of-chinese-commercial-nuclear-energy%26catid=118:content%26Itemid=376-http://www.ensec.org/index.php?option=com\_content%26view=article%26id=319:america-falling-behind-the-strategic-dimensions-of-chinese-commercial-nuclear-energy%26catid=118:content%26Itemid=376]

It appears that over the past two decades the US government has grown to accept America’s economic soft power as a permanent condition and hence has not felt compelled to promote or actively defend America’s position. The PRC is now showing that America’s economic strength can be mitigated and co-opted. To adequately counter Chinese activities the US will have to make greater efforts to clearly identify the situation and ensure that policy conforms to strategy in order for the US to advance its position. Prudent actions for US government include:

• Build a permanent storage facility, either at Yucca Mountain or elsewhere, to dispose of nuclear waste material. The lack of a permanent storage area is a limiting factor on any expansion of domestic nuclear power plants.

• Streamline the licensing and authorization process for new reactors. Some recent progress has been made in this area, but more can be done to improve efficiencies.

• Continue to build on the incentives for the construction of nuclear power plants that were put in place by the Energy Policy Act of 2005.

• Re-write US export controls to guard against PRC industrial espionage, improve US counterintelligence in places of nuclear research, and confront problems associated with deemed-export at US research institutions.

• Invest in nuclear energy research, specifically in safer more efficient reactors that reduce the upfront costs that often hamper nuclear power plant construction. Small reactors or modular construction represent two areas with good potential.

• Create a whole of government strategy for the construction and export of nuclear reactors and related equipment.

• These previous steps will allow the US to engage the PRC from a position of strength and begin a more serious dialogue that links economic cooperation on reactor construction to safer proliferation practices. America cannot stop the PRC from developing and exporting reactors, but the US can present more attractive, more technically sophisticated options and use diplomatic and economic pressure to influence China to act responsibly when exporting nuclear technology.

• Perhaps most importantly, consistent and strong leadership from the executive branch will be critical for implementing these policy changes and for framing the issue of nuclear commerce with regards to China in terms of security and international influence, not only in commercial terms.

The United States today still holds many advantages, both potential and actual, over the PRC. The innovative culture inherent in America is still pushing forward research. America has the means and tools at its disposal to remain competitive and successful in a world where China is a global power. The question is what America will decide it wants its place in the nuclear world to be. Nuclear energy commerce is important for US energy security with proliferation implications, but it is even more important because it is indicative of larger efforts on both sides of the Pacific to shape the 21st century.

### CP solves Desalination

#### And their desal ev isn’t specific to IFRs

**Arab News 12**—[JEDDAH: ARAB NEWS Monday 22 October 2012, Nuclear desalination will boost water and energy security, http://www.arabnews.com/nuclear-desalination-will-boost-water-and-energy-security]

The UAE’s water and energy security will receive a major boost if the desalination plants can be linked to nuclear power, says a top scientist.

Nuclear desalination is a well-known technology and the number of plants currently operating across the world strongly indicates the advantage, according to Youssef Shatilla, dean of academic programs, and professor — mechanical engineering, Masdar Institute of Science and Technology.

The remarks followed the announcement by the editorial board of the international journal Desalination, naming Youssef Shatilla and Ibrahim Khamis, Nuclear Power Technology Development Section, International Atomic Energy Agency (IAEA), as co-guest editors for a special issue dedicated to ‘Nuclear Desalination’.

Nidal Hilal, editor-in-chief of Desalination, has announced that both luminaries have accepted the offer for the special edition that will be published in March 2014.

This special issue will be open by the journal on November 1.

Shatilla said: “Since the creation of modern UAE, most of the water needs have been met through seawater desalination. The UAE is no stranger to the world of desalination as some of the largest desalination plants in the world are right here in our own backyard.”

Shatilla added: “Nuclear desalination is basically the same as conventional desalination, except for the source of energy, which comes from a nuclear power plant. Nuclear desalination plants have been deployed in various parts of the world ranging from developed to developing countries with commanding success. This gives confidence that such an undertaking, if implemented, will definitely be a huge addition to UAE’s water and energy security.”

### AT: Safety

#### SMR’s are safe --- passive mechanisms, less radiation, underground and proliferation resistant.

**Cunningham 12** (Nick, Policy Analyst for Energy and Climate at the American Security Project, "Small Modular Reactors: A Possible Path Forward for Nuclear Power", October, americansecurityproject.org/ASP%20Reports/Ref%200087%20-%20Small%20Modular%20Reactors.pdf)

Reduced Safety and Weapons Proliferation Concerns¶ SMRs can offer improved safety and security over conventional large reactors because of specific design features inherent to small reactors. First, one danger from nuclear power plants is the radiation from the reactor core. SMRs offer a reduction in danger from radiation because a smaller reactor core produces less radiation. 13¶ Second, due to their small size, SMRs are better able to incorporate passive safety features – those that do not require human or electronic actions to function properly. 14 These include cooling systems that use gravity instead of relying on access to power, natural convection systems, and passive heat removal. 15 For example, in the event something goes wrong, Westinghouse’s SMR is designed to keep the reactor cool for several days without the need for operators or power. 16 While the latest reactor designs are incorporating passive safety features, including for large reactors, passive safety features are inherently easier with small designs due to a smaller reactor core. ¶ Third, SMRs can benefit from a simplification of design, using less components, resulting in a more compact reactor. 17 SMR designs can eliminate the need for coolant pipes, which are considered the most significant safety challenge during the development of nuclear power plants. 18 An integral design, in which the primary reactor core, the steam generator, and the pressurizer are incorporated into a single common pressure vessel, is only possible in a small design. 19 In comparison, large reactors have components outside the containment vessel, increasing the chance of an accident. ¶ Fourth, unlike large reactors, SMRs can be installed underground, reducing the vulnerability to a terrorist attack or natural disaster. 20 A design from Gen4, a nuclear reactor vendor, seals off the reactor underground. This allows for it to never be opened once it is installed, enhancing proliferation resistance. 21 It would also operate for 10 years before refueling would be needed, compared to conventional large reactors that require refueling every 18-24 months. 22

#### Passive safety outweighs. Also more simplistic – less moving parts.

**Rosner 11** (Robert – Past Director of the Argonne National Laboratory, The William E. Wrather Distinguished Service Professor @ the Departments of Astronomy and Astrophysics and Physics, Enrico Fermi Institute, and the College, Senior Fellow @ the Computation Institute (CI), Stephen Goldberg – Special assistant to the director at Argonne National Laboratory, *Small Modular Reactors – Key to Future Nuclear Power Generation in the U.S.*, Energy Policy Institute at Chicago The Harris School of Public Policy Studies, Technical Paper, November 2011)

2.0 SAFETY CASE FOR SMRs

While the focus in this paper is on the business case for SMRs, the safety case also is an important element of the case for SMRs. Although SMRs (the designs addressed in this paper) use the same fuel type and the same light water cooling as gigawatt (GW)-scale light water reactors (LWRs), there are significant enhancements in the reactor design that contribute to the upgraded safety case. Appendix A provides a brief overview of the various technology options for SMRs, including the light water SMR designs that are the focus of the present analysis.

Light water SMR designs proposed to date incorporate passive safety features that utilize gravity-driven or natural convection systems – rather than engineered, pump-driven systems – to supply backup cooling in unusual circumstances. These passive systems should also minimize the need for prompt operator actions in any upset condition. The designs rely on natural circulation for both normal operations and accident conditions, requiring no primary system pumps. In addition, these SMR designs utilize integral designs, meaning all major primary components are located in a single, high-strength pressure vessel. That feature is expected to result in a much lower susceptibility to certain potential events, such as a loss of coolant accident, because there is no large external primary piping. In addition, light water SMRs would have a much lower level of decay heat than large plants and, therefore, would require less cooling after reactor shutdown. Specifically, in a **post-Fukushima** lessons-learned environment, the study team believes that the current SMR designs have three inherent advantages over the current class of large operating reactors, namely:

1. These designs mitigate and, potentially, eliminate the need for back-up or emergency electrical generators, relying exclusively on robust battery power to maintain minimal safety operations.

2. They improve seismic capability with the containment and reactor vessels in a pool of water underground; this dampens the effects of any earth movement and greatly enhances the ability of the system to withstand earthquakes.

3. They provide large and robust underground pool storage for the spent fuel, drastically reducing the potential of uncovering of these pools.

These and other attributes of SMR designs present a strong safety case. Differences in the design of SMRs will lead to different approaches for how the Nuclear Regulatory Commission (NRC) requirements will be satisfied. Ongoing efforts by the SMR community, the larger nuclear community, and the NRC staff have identified licensing issues unique to SMR designs and are working collaboratively to develop alternative approaches for reconciling these issues within the established NRC regulatory process. These efforts are summarized in Appendix B; a detailed examination of these issues is beyond the scope of this paper.

### AT: Time

#### Rollout is fast --- one to three years.

**Ringle 10** (John, Professor Emeritus of Nuclear Engineering at Oregon State University, "Reintroduction of reactors in US a major win", November 13, robertmayer.wordpress.com/2010/11/21/reintroduction-of-reactors-in-us-a-major-win/)

Small nuclear reactors will probably be the mechanism that ushers in nuclear power’s renaissance in the U.S.¶ Nuclear plants currently supply about 20 percent of the nation’s electricity and more than 70 percent of our carbon-free energy. But large nuclear plants cost $8 billion to $10 billion and utilities are having second thoughts about how to finance these plants.¶ A small modular reactor (SMR) has several advantages over the conventional 1,000-megawatt plant:¶ 1. It ranges in size from 25 to 140 megawatts, hence only costs about a tenth as much as a large plant.¶ 2. It uses a cookie-cutter standardized design to reduce construction costs and can be built in a factory and shipped to the site by truck, railroad or barge.¶ 3. The major parts can be built in U.S. factories, unlike some parts for the larger reactors that must be fabricated overseas.¶ 4. Because of the factory-line production, the SMR could be built in three years with one-third of the workforce of a large plant.¶ 5. More than one SMR could be clustered together to form a larger power plant complex. This provides versatility in operation, particularly in connection with large wind farms. With the variability of wind, one or more SMRs could be run or shut down to provide a constant base load supply of electricity.¶ 6. A cluster of SMRs should be very reliable. One unit could be taken out of service for maintenance or repair without affecting the operation of the other units. And since they are all of a common design, replacement parts could satisfy all units. France has already proved the reliability of standardized plants.¶ At least half a dozen companies are developing SMRs, including NuScale in Oregon. NuScale is American-owned and its 45-megawatt design has some unique features. It is inherently safe. It could be located partially or totally below ground, and with its natural convection cooling system, it does not rely on an elaborate system of pumps and valves to provide safety. There is no scenario in which a loss-of-coolant accident could occur.