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#### Financial incentives are rebates, grants, loans, Tax Incentives, green building incentives, and industrial recruitment. Distinct from Community Investment & Rules & regulations

#### The aff isn’t an example of a topical incentive

Gouchoe 2k—North Carolina State University, National Renewable Energy Laboratory [Susan, December 2000, Local Government and Community Programs and Incentives for Renewable Energy— National Report, http://seg.fsu.edu/Library/casestudy%20of%20incentives.pdf]

EXECUTIVE SUMMARY

This report presents a summary of the renewable energy programs and incentives of 45¶ communities in 23 states as collected and catalogued by the Interstate Renewable Energy¶ Council’s (IREC) Database of State Incentives for Renewable Energy (DSIRE) project. Also included are summaries of state initiatives that impact implementation of renewable energy¶ technologies on the local level. Programs and incentives in this report include:

COMMUNITY INVESTMENT & AWARENESS PROGRAMS

v Renewable Energy Projects

v Education & Assistance

v Green Pricing Programs

v Green Power Purchasing

FINANCIAL INCENTIVES

v Rebates, Grants, & Loans

v Tax Incentives

v Green Building Incentives

v Industrial Recruitment

RULES, REGULATIONS & POLICIES

v Solar & Wind Access

v Net Metering

v Construction & Design

v Contractor Licensing

v Equipment Certification

v Public Benefits Funds

v Renewable Energy Portfolio Standards

v Disclosure & Certification

Established in 1995, DSIRE is an ongoing project to summarize incentives, programs, and¶ policies for renewable energy. The project is funded by the U.S. Department of Energy’s¶ Office of Power Technologies and is managed by the North Carolina Solar Center. DSIRE on¶ Line makes the DSIRE database accessible via the web at:¶ http://www.ncsc.ncsu.edu/dsire.htm. The website is updated daily and includes search¶ capabilities for all incentives. In addition to state and local programs, the website features¶ utility programs and a searchable bibliography.

#### VOTE NEGATIVE

#### PREDICTABLE LIMITS—the word incentives in the resolution is modified by financial to make it manageable. Going beyond makes the topic unpredictable.

#### GROUND—financial incentives insure the aff has links to market disads and counterplans which are the only core negative ground across bi-directional energies. Holding the line key

### 1NC PIC

#### Text: The United States Federal Government should acquire electricity from modular light water nuclear reactors with electrical output less than 300 megawatt electrical for its military installations in the United States.

#### The CP only incentivizes light water reactors. The plan’s open-ended incentive would be available for other SMR designs. Companies are designing thorium SMRs for military installations.

Dan Yurman, 4/13/2012. Publishes a blog on nuclear energy titled 'Idaho Samizdat’ and is a frequent contributor to ANS Nuclear Café. “Nuclear start-ups have stretch goals,” The Energy Collective, http://theenergycollective.com/dan-yurman/82076/nuclear-start-ups-have-stretch-goals.

\*\*\*Kirk Sorensen = NASA aerospace engineer

On his website Kirk Sorensen writes that Flibe Energy is a new company that will develop small modular reactors based on liquid-fluoride thorium reactor (LFTR) technology. Liquid-fluoride reactors operate at high temperature but not at high pressure because they use a chemically stable medium as the fuel and the coolant, making them much safer to operate than conventional reactors. He says that "Thorium is the only abundant nuclear fuel that can be efficiently utilized in a thermal-spectrum reactor and is uniquely chemically suited for use in a fluoride reactor." The market for the design is based on an assessment that there are many remote sites where electrical power is generated by diesel fuel that is transported over great distances and over challenging or hostile terrain. A small modular power source has the potential to reduce the costs, hazards and vulnerability of power supply-lines, saving money and even lives in term of providing power to military bases. This blog caught up with Kirk Sorensen as he was getting ready for an international trip. He responded to questions via email. Here's what he said.   
Q: Why did you choose this specific technology? What is about it that helped you decide on it?  
A: Of the four coolant possibilities (water, liquid-metals, gas, and molten-salt) only molten salt has the desireable attributes of both high temperature operation yet low pressure operation. Halide molten-salts are also impervious to radiation damage due to their ionic structure. Fluoride molten-salt chemistry is a natural fit with the thorium fuel cycle, which leads to very high fuel utilization and minimizes waste generation and nearly eliminates transuranic waste generation. Molten-salt fuels can also reject xenon in normal operation, facilitating load-following characteristics in a small, high-power density core. The key to these plans is the use of liquid-fluoride-salt technology—and a special combination of fluoride salts which gives Flibe Energy its name. Lithium fluoride (LiF) and beryllium fluoride (BeF2) together form a solution often called “F-Li-Be”, that is the ideal medium for nuclear chemical processing and reactor operation. It is chemically stable, nearly invisible to neutrons, and impervious to radiation damage, unlike almost every other nuclear fuel. Flibe carries large amounts of heat at low pressures, leading to small, compact, and safe designs for nuclear reactors.

Q: Why would a customer want to buy it?

Our intent is not to sell our reactors but rather to build and operate them.

Q: **Who is your target market?**

A: **Military facilities in the continental United States**.

Q: What is your time frame for developing the technology, e.g., major milestones such as; - prototype - completed design - NRC licensing - Construction at customer site

A: Assuming the desired funding, we would be aiming for a prototype within five years of project initiation and five years of "shakedown" operation beyond that. Beyond that we would build units in a factory and deploy them to various military bases across the US. The US military has independent regulatory authority and we would not be pursuing NRC licensing.

#### DOD purchasing agreements are critical to get advanced SMR designs through the Valley of Death—sparks broader commercialization.

Richard Andres and Hanna Breetz, 2011. Professor of National Security Strategy at the National War College and a Senior Fellow and Energy and Environmental Security and Policy Chair in the Center for Strategic Research, Institute for National Strategic Studies, at the National Defense University; and doctoral candidate in the Department of Political Science at The Massachusetts Institute of Technology. “Small Nuclear Reactors for Military Installations: Capabilities, Costs, and Technological Implications,” [www.ndu.edu/press/lib/pdf/StrForum/SF-262.pdf](http://www.ndu.edu/press/lib/pdf/StrForum/SF-262.pdf).

Thus far, this paper has reviewed two of DOD’s most pressing energy vulnerabilities—grid insecurity and fuel convoys—and explored how they could be addressed by small reactors. We acknowledge that there are many uncertainties and risks associated with these reactors. On the other hand, failing to pursue these technologies raises its own set of risks for DOD, which we review in this section: first, small reactors may fail to be commercialized in the United States; second, the designs that get locked in by the private market may not be optimal for DOD’s needs; and third, expertise on small reactors may become concentrated in foreign countries. By taking an early “first mover” role in the small reactor market, DOD could mitigate these risks and secure the long-term availability and appropriateness of these technologies for U.S. military applications. The “Valley of Death Given the promise that small reactors hold for military installations and mobility, DOD has a compelling interest in ensuring that they make the leap from paper to production. However, if DOD does not provide an initial demonstration and market, there is a chance that the U.S. small reactor industry may never get off the ground. The leap from the laboratory to the marketplace is so difficult to bridge that it is widely referred to as the “Valley of Death.” Many promising technologies are never commercialized due to a variety of market failures— including technical and financial uncertainties, information asymmetries, capital market imperfections, transaction costs, and environmental and security externalities— that impede financing and early adoption and can lock innovative technologies out of the marketplace. 28 In such cases, the Government can help a worthy technology to bridge the Valley of Death by accepting the first mover costs and demonstrating the technology’s scientific and economic viability.29 [FOOTNOTE 29: There are numerous actions that the Federal Government could take, such as conducting or funding research and development, stimulating private investment, demonstrating technology, mandating adoption, and guaranteeing markets. Military procurement is thus only one option, but it has often played a decisive role in technology development and is likely to be the catalyst for the U.S. small reactor industry. See Vernon W. Ruttan, Is War Necessary for Economic Growth? (New York: Oxford University Press, 2006); Kira R. Fabrizio and David C. Mowery, “The Federal Role in Financing Major Inventions: Information Technology during the Postwar Period,” in Financing Innovation in the United States, 1870 to the Present, ed. Naomi R. Lamoreaux and Kenneth L. Sokoloff (Cambridge, MA: The MIT Press, 2007), 283–316.] Historically, nuclear power has been “the most clear-cut example . . . of an important general-purpose technology that in the absence of military and defense related procurement would not have been developed at all.”30 **Government involvement is likely to be crucial for innovative, next-generation nuclear technology** as well. Despite the widespread revival of interest in nuclear energy, Daniel Ingersoll has argued that radically innovative designs face an uphill battle, as “the high capital cost of nuclear plants and the painful lessons learned during the first nuclear era have created a prevailing fear of first-of-a-kind designs.”31 In addition, Massachusetts Institute of Technology reports on the Future of Nuclear Power called for the Government to provide modest “first mover” assistance to the private sector due to several barriers that have hindered the nuclear renaissance, such as securing high up-front costs of site-banking, gaining NRC certification for new technologies, and demonstrating technical viability.32 It is possible, of course, that small reactors will achieve commercialization without DOD assistance. As discussed above, they have garnered increasing attention in the energy community. Several analysts have even argued that small reactors could play a key role in the second nuclear era, given that they may be the only reactors within the means of many U.S. utilities and developing countries.33 However, given the tremendous regulatory hurdles and technical and financial uncertainties, it appears far from certain that the U.S. small reactor industry will take off. If DOD wants to ensure that small reactors are available in the future, then it should pursue a leadership role now.

#### Thorium would out-compete LWRs.

Megan Wait, 2/25/2011. “Thorium could trigger a nuclear renaissance, given its many advantages over uranium,” Mining Weekly, http://www.miningweekly.com/article/thorium-could-trigger-nuclear-renaissance-given-its-many-advantages-over-uranium-2011-02-25.

Mulder differs: “The cost of mining thorium and converting it to fuel is much cheaper than the mining and processing of uranium, in terms of less capital equipment requirements at start-up, as well as lower operating costs. Also, thorium is relatively abundant in most parts of the world, so, relative to uranium oxide mining and processing, the cost of potential energy for each unit of thorium is 25% to 33% lower,” he adds. The approximate cost of a single standalone Gen-3 light water reactor (LWR) for each megawatt of installed capacity is in the region of $5 400/kW. It is estimated that the first standalone Gen-4 thorium modular reactor will cost about $5 000/kW of installed capacity. As additional modules of the thorium modular reactors (TMRs) are built and standardisation allows the builders and the subsystem equipment suppliers to become more efficient, it is estimated that the cost will be reduced to $4 500/MW, or nearly 20% less. Mulder argues that TMRs have an advan- tage over LWRs, as the latter is characterised by infrequency of construction. Further, owing to the simplicity of the design of the thorium modular reactor, which scales up arithmetically rather than geometrically, larger modules of the TMR, ranging between 40 MW, 80 MW and 165 MW, can be built at similar cost for each unit of power delivered to the grid, without significant additional research and development (R&D). “The economics of the TMR are compelling. They are less expensive to build, commission, operate and decommission than a comparable LWR. An important part of the savings is that TMRs have a short construction period of about two years, compared to LWRs, which take 6 to 10 years to build,” Mulder comments. The estimated available thorium reserves within the earth’s crust are three or four times the world’s uranium reserves. Combined with its greater energy efficiency, as a high-temperature reactor, it can be shown that there are at least enough thorium reserves to last about 4 500 years.

#### Undermines global uranium demand

I.B Lambert, 2012. Geoscience Australia, Secretary General 34th IGC. “Global Uranium And Thorium Resources: Are They Adequate To Satisfy Demand Over The Next Half Century?” Geophysical Research Abstracts, Vol 14, meetingorganizer.copernicus.org/EGU2012/EGU2012-2544.pdf.

This presentation will consider the adequacy of global uranium and thorium resources to meet realistic nuclear power demand scenarios over the next half century. It is presented on behalf of, and based on evaluations by, the Uranium Group - a joint initiative of the OECD Nuclear Energy Agency and the International Atomic Energy Agency, of which the author is a Vice Chair. The Uranium Group produces a biennial report on Uranium Resources, Production and Demand based on information from some 40 countries involved in the nuclear fuel cycle, which also briefly reviews thorium resources. Uranium: In 2008, world production of uranium amounted to almost 44,000 tonnes (tU). This supplied approxi- mately three-quarters of world reactor requirements (approx. 59,000 tU), the remainder being met by previously mined uranium (so-called secondary sources). Information on availability of secondary sources—which include uranium from excess inventories, dismantling nuclear warheads, tails and spent fuel reprocessing—is incomplete, but such sources are expected to decrease in market importance after 2013. In 2008, the total world Reasonably Assured plus Inferred Resources of uranium (recoverable at less than $130/kgU) amounted to 5.4 million tonnes. In addition, it is clear that there are vast amounts of uranium recoverable at higher costs in known deposits, plus many as yet undiscovered deposits. The Uranium Group has concluded that the uranium resource base is more than adequate to meet projected high-case requirements for nuclear power for at least half a century. This conclusion **does not assume increasing replacement of uranium by** fuels from reprocessing current reactor wastes, or by **thorium**, nor greater reactor efficiencies, **which are likely to ameliorate future uranium demand**. However, progressively increasing quantities of uranium will need to be mined, against a backdrop of the relatively small number of producing facilities around the world, geopolitical uncertainties and strong opposition to growth of nuclear power in a number of quarters—it is vital that the market provides incentives for exploration and development of environmentally sustainable mining operations. Thorium: World Reasonably Assured plus Inferred Resources of thorium are estimated at over 2.2 million tonnes, in hard rock and heavy mineral sand deposits. At least double this amount is considered to occur in as yet undiscovered thorium deposits. Currently, demand for thorium is insignificant, but even a major shift to thorium-fueled reactors would not make significant inroads into the huge resource base over the next half century.

#### That destroys Kazakh economic modernization.

Gregory Gleason, 12/14/2011. Professor at the University of New Mexico and the George C. Marshall European Center for Security Studies. “KAZATOMPROM LOOKS EAST,” Central Asia Caucasus Institute Analyst, http://cacianalyst.org/?q=node/5683/print.

BACKGROUND: **Kazakhstan’s uranium industry is a key part of the country’s diversification and modernization strategy**. Kazakhstan played an important role in the Soviet nuclear industry with major mining, processing, fabricating and industrial facilities. Kazakhstan was the home of the Soviet Union’s major experimenting and testing facilities. The end of the Soviet Union brought the Soviet-era nuclear complex to a standstill. The first decree signed by Nursultan Nazarbayev, Kazakhstan’s first president, was to immediately close the Soviet nuclear weapons test range. Kazakhstan’s government moved quickly to eliminate the Soviet-era nuclear weapons and weapons facilities, and the country signed on to the basic principles of the Nuclear Non-proliferation treaty by rejecting nuclear armaments while endorsing peaceful use of the atom. Due to Kazakhstan’s large uranium mineral reserves, the development of the uranium industry for peaceful uses became **one of Kazakhstan’s economic policy priorities**. Kazakhstan’s industrial privatization program in the mid-1990s gave rise to numerous industrial enterprises but the uranium industry, because of its dual role as a commercial as well as a strategic resource, was retained under government control. In 1997, the Kazakhstani government formed Kazatomprom, a state-run mineral and industrial complex with direct responsibility for the uranium industry as well as for some other specialized industrial metals such as beryllium and tantalum. In a very short period of time Kazatomprom brilliantly succeeded in cobbling together Kazakhstan’s remnants of the Soviet-era uranium complex to build an industrial juggernaut in the uranium business. Kazatomprom surpassed its competitors in 2009 by emerging as the world’s largest producer of uranium ore. Kazatomprom’s success was achieved through a business model which linked Kazakhstan’s upstream mineral extraction with the downstream industrial facilities located elsewhere. Kazatomprom turned first to the Russian uranium industry, drawing on long-standing relations with Russia’s state-run nuclear complex under the control of Rosatom and with Russia’s related nuclear industry commercial firms. Later Kazatomprom moved outside the connections of the former Soviet space to forge business connections with foreign partners, forming joint ventures with leading technological partners such as France’s Areva and Canada’s Cameco. But Russia’s nuclear industry remained the locomotive driving Kazakhstan’s nuclear sector as it moved from the role of primary commodity supplier to the role of an integrated transnational industrial enterprise. Working in parallel, driven by state-financed enterprises and focused on jointly gaining a position to capture the expanding nuclear services market, Russia’s Rosatom and Kazakhstan’s Kazatomprom made major investments in a coordinated effort to corner the future nuclear reactor fuel supply market in Asia, focusing on China, India, Japan and Korea.

#### Kazakh economic development is a key model for Central Asia—instability would spread and trigger Central Asian conflict.

Margarita Assenova et al, 2008. Director of Institute for New Democracies @ CSIS; with Natalie Zajicova, Program Officer (IND); Janusz Bugajski, CSIS NEDP Director; Ilona Teleki, Deputy Director and Fellow (CSIS); Besian Bocka, Program Coordinator and Research Assistant (CSIS). “Kazakhstan’s Strategic Significance,” CSIS Institute for New Democracies, http://eurodialogue.org/Kazakhstan-Strategic-Significance.

The decision by the Organization for Security and Cooperation in Europe (OSCE) to award Kazakhstan the chairmanship of the organization for 2010 underscores a growing recognition of the country’s regional and continental importance. Kazakhstan is a strategic linchpin in the vast Central Asian-Caspian Basin zone, a region rich in energy resources and a potential gateway for commerce and communications between Europe and Asia.

However, it is also an area that faces an assortment of troubling security challenges. Ensuring a stable and secure Central Asia is important for the international interests of the United States and its European allies for several prescient reasons:

• Asian Security: Because of its proximity to Russia, China, Iran, and the South Asian sub-continent, **Kazakhstan’s security and stability is an increasingly vital interest to all major powers**. Kazakhstan’s tenure as chair of the OSCE will become an opportunity for greater multilateral cooperation in achieving this objective while strengthening the role and prestige of the OSCE throughout Central Asia.

• Afghanistan: Central Asia is a key staging area for U.S. and NATO military operations in Afghanistan against Taliban insurgents and Al Qaeda militants. Central Asia is a crucial conduit for U.S. and NATO troops and supplies into Afghanistan. U.S. offi cials recently reached new agreements with Russia, Kazakhstan, and other Central Asian countries to allow Afghanbound non-military supplies through their territories.

• Trans-National Terrorism: The Taliban resurgence in Afghanistan stimulates cross-border terrorism that may endanger the stability of several Central Asian neighbors and undermine Western interests. Central Asian states have been the victims of Afghanistan-based transnational terrorism. These states, including Kazakhstan, can support international efforts to counter regional terrorist networks.

• Organized Crime and Drug Traffi cking: Central Asia is an important transit region for narcotics traffi cking between Afghanistan and the countries of Europe and Asia. Joint initiatives that will enable the Kazakh government to control and monitor borders more effectively, intercept smuggling operations, and eradicate criminal networks will buttress international security and curtail funding to cross-border terrorist groups.

• Energy Security: Central Asia has the potential to be a vital energy source for Europe. The region contains a vast storehouse of oil and natural gas, which Europe urgently needs in order to lessen its reliance on Russian and Middle Eastern energy supplies. Disputes between Russia and several energy transit states, such as Ukraine, have increased Europe’s interest in developing direct supply lines between Europe and the Caspian countries.  
Challenges to International Interests

Despite the strategic significance of Central Asia and the Caspian Basin, in recent years Western countries have not paid sufficient attention to the region. This is due to a combination of factors, including the absence of a shared strategic framework for helping to stabilize and develop the heartland of Asia; insufficient focus on consolidating close political ties with key countries in the region through ustained high-level engagement; and opposition on the part of other major powers competing for influence in Central Asia.

Many Western experts conclude that Russia’s leaders have sought to use multi-national organizations, Moscow’s political connections and its economic leverage to assert greater control over ex-Soviet neighbors. There are reports that the Central Asian governments were pressured to curtail Western security interests, including limiting its military presence in the region by, for example, urging Uzbekistan and Kyrgyzstan to evict the U.S. military from bases on their territory.

Kazakh leaders are supportive of a more effective American and European role in Central Asia to help promote the region’s security and development, but without undermining Astana’s cordial relations with Russia. Kazakhstan’s independent foreign policy helps provide Western access to the region and enhances its position as a vital transport corridor. **Kazakhstan is** also **a stabilizing factor in the geopolitical competition of the regional powers for access and influence across Central Asia**. With its reinvigorated commitment to securing Afghanistan and stabilizing the wider region, the Obama administration has an ideal opportunity to reach out to key partners such as Kazakhstan and to enhance Astana’s role as a regional stabilizer.  
Kazakhstan as a Regional Stabilizer

Despite having the largest territory and economy in Central Asia, Kazakhstan is not a source of insecurity or threat to any of its neighbors. It does not employ territorial, ethnic, economic, or energy instruments to target and undermine any government in the region. On the contrary, Astana has sought to establish a system of collective security in Eurasia that would avert the emergence of a single dominant power. Kazakhstan’s “multi-vector” foreign policy, which seeks to pursue cooperative relations with all major powers, leads Astana to resist any hegemonic ambitions by larger countries that would undercut Kazakhstan’s political or economic independence.

While it is a member of the Commonwealth of Independent States (CIS), the Collective Security Treaty Organization (CSTO), and the Shanghai Cooperation Organization (SCO), Kazakhstan has sought to diversify its security relations and keep its freedom to establish and maintain international partnerships. Indeed, Astana has developed productive contacts with NATO by participating in NATO’s Euro-Atlantic Partnership Council (EAPC) and its Partnership for Peace (PfP) program. It was the only Central Asian government to negotiate an Individual Partnership Action Plan (IPAP) with NATO in January 2006.

NATO’s June 2004 summit affirmed the growing importance of Central Asia by designating the region as an area of “special focus” and stationing a liaison officer in the Kazakh capital of Astana in order to develop NATO assistance programs to modernize national military structures. A NATO Secretary General Special Representative for the Caucasus and Central Asia was also appointed.

Astana has underscored that neither the CSTO nor the SCO should become exclusive military alliances or anti-Western blocs that would challenge NATO’s mission in the wider region. Kazakhstan supports NATO operations in Afghanistan and grants overflight rights to U.S. and other NATO warplanes transporting non-lethal cargo to Afghanistan, as well as emergency landing rights for U.S. military aircraft in the Kazakh city of Almaty. The Kazakh authorities are also developing a Peacekeeping Battalion (KAZBAT), which is slated to become fully operational by 2011 and potentially available for international peace stability missions.

Kazakhstan is the only Central Asian country to have an Action Plan to assist in the reconstruction process in Afghanistan, including granting more than $3 million in the 2007-2008 fiscal year for social and infrastructure projects, humanitarian aid, and training for Afghan law enforcement and border patrol officers. For 2009-2011, Kazakhstan has committed an additional $5 million to improve the water supply and distribution infrastructure for shipments of grain and other commodities.

Kazakhstan also provides funding to support U.S. objectives in the region. Astana is the only regional donor giving significant aid to Kyrgyzstan, Tajikistan, and Afghanistan. According to the U.S. State Department’s Background note on Kazakhstan, “in 2006, Kazakhstan became the first country to share directly in the cost of a U.S. Government’s foreign assistance program. Through 2009, the Government of Kazakhstan will contribute over $15 million of a $40 million USAID economic development project aimed at strengthening Kazakhstan’s capacity to achieve its development goals.”

Kazakhstan has initiated and championed the Conference on Interaction and Confidence-Building in Asia (CICA). Modeled after the OSCE, the CICA process aims to promote peace and security throughout Eurasia through confidence-building measures and other means. The first CICA summit, held in June 2002, was attended by leaders from 16 states who signed the “Almaty Act,” as well as a declaration to eliminate terrorism and promote inter-cultural dialogue. The second CICA summit (hosted by Kazakhstan in June 2006) adopted the Catalogue of Confidence Building Measures (CBM)—a road map for implementing the CBM on a bilateral and multilateral basis. At the last CICA working meeting in India in February 2009, the participating states selected Turkey to chair the conference and host the third CICA summit in 2010. The Turkish chairmanship will expand CICA geographically and move it closer to Europe.  
Multi-National Counter-Terrorism

Kazakhstan has been combating several potential threats to its own stability and that of its neighbors, including terrorism, drug smuggling, and organized crime. Although Kazakhstan is generally not a source of these maladies, it is a transit country for such illicit activities. Kazakh leaders have been especially concerned about possible terrorist strikes against their country’s energy infrastructure that could affect exports to European and other consumers. To counter terrorist threats, the Kazakh government has supported multilateral efforts in key multilateral organizations to make counter-terrorism an essential ingredient of their security focus. Astana has also assigned troops to the Central Asian Rapid Reaction Force (CARRF), which is designed to defend each country against major terrorist threats.  
Regional Non-Proliferation

KazakhstanwasthefirstformerSovietrepublictoabandon its nuclear arsenal. It closed the largest nuclear weapons test site and has spearheaded regional denuclearization. Kazakh leaders have also made major progress in downgrading nearly all of the country’s highly enriched uranium, thus lessening the opportunities for such material to fall into the hands of foreign governments or terrorist groups. Astana’s non-proliferation initiatives have earned it praise from a number of international leaders.

With impetus from Kazakhstan, the Central Asian states have agreed to coordinate their nonproliferation and export control policies, especially to prevent the smuggling of Weapons of Mass Destruction (WMD) and related materials from the former Soviet Union. In September 2006 in Semipalatinsk, a former Soviet nuclear testing site in Kazakhstan, representatives of the five Central Asian states signed a treaty to create a Central Asian Nuclear Weapon Free Zone, which entered into force on March 21, 2009. The signatories pledged not to develop, manufacture, or otherwise acquire nuclear devices or to assist third parties in developing nuclear weapons programs. The treaty further addressed environmental protection as each of the five states share common problems of environmental damage resulting from the production and testing of Soviet nuclear weapons.  
Counter-Narcotics Trafficking

Countering the trafficking of narcotics from Afghanistan through Central Asia is a major security challenge for all countries in the region, as well as an issue of concern for European and Asian states seeking to stabilize Afghanistan. Proceeds from large-scale smuggling finance organized crime and cross-border terrorism. Central Asian states, including Kazakhstan, have been active in joint operations to intercept drug shipments from Afghanistan and are expanding their counter-narcotics agencies to deal more effectively with the threat. The Central Asian Regional Information and Coordination Centre (CARICC), established in Almaty under UN auspices, serves as the main regional communication center for analysis and exchange of information on transnational crime and the coordination of joint operations. The OSCE, which Kazakhstan will chair in 2010, has established the priority of curbing drug and arms smuggling, strengthening border controls to curtail illegal migration, and countering the financing of terrorist and criminal organizations.  
Energy Security

Kazakhstan is a major producer and exporter of crude oil, projected to export three million barrels of oil per day, or 150 million tons per year, by 2015. Kazakhstan also possesses substantial natural gas reserves and some of the world’s largest reserves of uranium.

The three energy-rich states of Central Asia (Kazakhstan, Uzbekistan, and Turkmenistan) understand that their political independence and energy security requires diversifying their energy customers and avoiding reliance on any single power or transit route. Currently, Russia is the main transit route for energy exports from Central Asia. Kazakhstan supports building oil and gas pipelines that would channel its energy resources directly to Europe and China. The Kazakh energy industry favors a direct energy connection with Azerbaijan across the Caspian Sea that would help supply the European market.

Astana is seeking to diversify its economy and avoid over-dependence on natural resources and energy exports. Until recently, oil and gas revenues have been aggressively used to develop a stronger economic foundation for expansion into new markets. Kazakhstan seeks to attract advanced technologies and modern management practices into its priority economic sectors, including high technology, financial services, and agriculture. However, the current global financial crisis poses considerable challenges to this agenda, not least because of the weaknesses it has exposed in Kazakhstan’s banking and financial services sector.  
Economic Development

Sustained economic development is a **major determinant of long-term regional stability**. Kazakhstan has **emerged as a successful model of economic development in Central Asia** and the secular Muslim world. It has the largest economy in Central Asia with a Gross Domestic Product (GDP) exceeding the combined total of its four Central Asian neighbors. The government is in the process of negotiating its entry into the World Trade Organization (WTO) and is a leading proponent of deepening economic cooperation in Central Asia and the Caspian region.

Kazakh leaders have focused on developing the Euro-Asian Economic Community (EurAsEC), an organization that also involves Belarus, Kazakhstan, Kyrgyzstan, Russia, and Tajikistan. More generally, Kazakhstan has strongly supported **deeper economic integration** among these states. Nonetheless, Astana opposes over-reliance on any single country because this would undermine Kazakhstan’s independence and integration into the global economy.

In positioning Kazakhstan as a **potential economic hub and the core of a “Eurasian transport corridor**,” President Nursultan Nazarbayev has proposed creating a regional organization, styled as the Eurasian Economic Union (EEU), to harness and intensify trans-border cooperation in such areas as water resource management, transportation infrastructure, crisis-response, environmental protection, and region-wide economic development. Such a process, even without the support of all Central Asian countries, could be the first steps toward lowering barriers to trade, harmonizing customs, and building closer economic associations. Kazakh officials contend that closer economic integration would reduce regional tensions, attract greater levels of foreign direct investment, and increase the region’s leverage and competitiveness in the international arena. Integration has also been fostered by tangible investments and capital flows as Kazakhstan has played a major role in exporting capital to its neighbors.

#### Central Asia conflict will escalate to US-Russian nuclear war—network-centric warfare compresses decision-making times and triggers miscalculation.

McDermott 11—Roger McDermott, Honorary senior fellow, department of politics and international relations, university of Kent at Canterbury and senior fellow in Eurasian military studies, Jamestown Foundation [December 6, 2011, “General Makarov Highlights the “Risk” of Nuclear Conflict,” Eurasia Daily Monitor, http://www.jamestown.org/programs/edm/single/?tx\_ttnews%5Btt\_news%5D=38748&tx\_ttnews%5BbackPid%5D=27&cHash=dfb6e8da90b34a10f50382157e9bc117]

In the current election season the Russian media has speculated that the Defense Minister Anatoliy Serdyukov may be replaced, possibly by Dmitry Rogozin, Russia’s Ambassador to NATO, which masks deeper anxiety about the future direction of the Armed Forces. The latest rumors also partly reflect uncertainty surrounding how the switch in the ruling tandem may reshuffle the pack in the various ministries, as well as concern about managing complex processes in Russian defense planning. On November 17, Russia’s Chief of the General Staff, Army-General Nikolai Makarov, offered widely reported comments on the potential for nuclear conflict erupting close to the country’s borders. His key observation was controversial, based on estimating that thepotential for armed conflict along the entire Russian periphery had grown dramatically over the past twenty years (Profil, December 1; Moskovskiy Komsomolets, November 28; Interfax, November 17). During his speech to the Defense Ministry’s Public Council on the progress and challenges facing the effort to reform and modernize Russia’s conventional Armed Forces, Makarov linked the potential for local or regional conflict to escalate into large-scale warfare “possibly even with nuclear weapons.” Many Russian commentators were bewildered by this seemingly “alarmist” perspective. However, they appear to have misconstrued the general’s intention, since he was actually discussing conflict escalation (Interfax, ITAR-TASS, November 17; Moskovskiy Komsomolets, Krasnaya Zvezda, November 18). Makarov’s remarks, particularly in relation to the possible use of nuclear weapons in war, were quickly misinterpreted. Three specific aspects of the context in which Russia’s most senior military officer addressed the issue of a potential risk of nuclear conflict may serve to necessitate wider dialogue about the dangers of escalation. There is little in his actual assertion about the role of nuclear weapons in Russian security policy that would suggest Moscow has revised this; in fact, Makarov stated that this policy is outlined in the 2010 Military Doctrine, though he understandably made no mention of its classified addendum on nuclear issues (Kommersant, November 18). Russian media coverage was largely dismissive of Makarov’s observations, focusing on the idea that he may have represented the country as being surrounded by enemies. According to Kommersant, claiming to have seen the materials used during his presentation, armed confrontation with the West could occur partly based on the “anti-Russian policy” pursued by the Baltic States and Georgia, which may equally undermine Moscow’s future relations with NATO. Military conflict may erupt in Central Asia, caused by instability in Afghanistan or Pakistan; or western intervention against a nuclear Iran or North Korea; energy competition in the Arctic or foreign inspired “color revolutions” similar to the Arab Spring and the creation of a European Ballistic Missile Defense (BMD) system that could undermine Russia’s strategic nuclear deterrence also featured in this assessment of the strategic environment (Kommersant, November 18). Since the reform of Russia’s conventional Armed Forces began in late 2008, Makarov has consistently promoted adopting network-centric capabilities to facilitate the transformation of the military and develop modern approaches to warfare. Keen to displace traditional Russian approaches to warfare, and harness military assets in a fully integrated network, Makarov possibly more than any senior Russian officer appreciates that the means and methods of modern warfare have changed and are continuing to change (Zavtra, November 23; Interfax, November 17). The contours of this evolving and unpredictable strategic environment, with the distinctions between war and peace often blurred, interface precisely in the general’s expression of concern about nuclear conflict: highlighting the risk of escalation. However, such potential escalation is linked to the reduced time involved in other actors deciding to intervene in a local crisis as well as the presence of network-centric approaches among western militaries and being developed by China and Russia. From Moscow’s perspective, NATO “out of area operations” from Kosovo to Libya blur the traditional red lines in escalation; further complicated if any power wishes to pursue intervention in complex cases such as Syria. Potential escalation resulting from local conflict, following a series of unpredictable second and third order consequences, makes Makarov’s comments seem more understandable; it is not so much a portrayal of Russia surrounded by “enemies,” as a recognition that, with weak conventional Armed Forces, in certain crises Moscow may have few options at its disposal (Interfax, November 17). There is also the added complication of a possibly messy aftermath of the US and NATO drawdown from Afghanistan and signs that the Russian General Staff takes Central Asian security much more seriously in this regard. The General Staff cannot know whether the threat environment in the region may suddenly change. Makarov knows the rather limited conventional military power Russia currently possesses, which may compel early nuclear first use likely involving sub-strategic weapons, in an effort to “de-escalate” an escalating conflict close to Russia’s borders. Moscow no longer primarily fears a theoretical threat of facing large armies on its western or eastern strategic axes; instead the information-era reality is that smaller-scale intervention in areas vital to its strategic interests may bring the country face-to-face with a network-centric adversary capable of rapidly exploiting its conventional weaknesses. As Russia plays catch-up in this technological and revolutionary shift in modern warfare capabilities, the age-old problem confronts the General Staff: the fastest to act is the victor (See EDM, December 1). Consequently, Makarov once again criticized the domestic defense industry for offering the military inferior quality weapons systems. Yet, as speed and harnessing C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) become increasingly decisive factors in modern warfare, the risks for conflict escalation demand careful attention—especially when the disparate actors possess varied capabilities. Unlike other nuclear powers, Russia has to consider the proximity of several nuclear actors close to its borders. In the coming decade and beyond, Moscow may pursue dialogue with other nuclear actors on the nature of conflict escalation and de-escalation. However, with a multitude of variables at play ranging from BMD, US Global Strike capabilities, uncertainty surrounding the “reset” and the emergence of an expanded nuclear club, and several potential sources of instability and conflict, any dialogue must consider escalation in its widest possible context. Makarov’s message during his presentation, as far as the nuclear issue is concerned, was therefore a much tougher bone than the old dogs of the Cold War would wish to chew on.

### 1NC DA 1

#### They require reprocessing and spur proliferation.

Edwards 11—Gordon Edwards, Ph.D., President, Canadian Coalition for Nuclear Responsibility [July 13, 2011, “Thorium Reactors: Back to the Dream Factory,” http://www.ccnr.org/Thorium\_Reactors.html]

Thorium is not a nuclear fuel

The fundamental fact about thorium is that it is NOT a nuclear fuel, because thorium is not a fissile material, meaning that it cannot sustain a nuclear fission chain reaction.

In fact the ONLY naturally occurring fissile material is uranium-235, and so -- of necessity -- that is the material that fuels all of the first-generation reactors in the entire world. Thorium cannot replace uranium-235 in this regard. Not at all.

Thorium is a "fertile" material

But thorium-232, which is a naturally occurring radioactive material, is about three times as abundant as uranium-238, which is also a naturally occurring radioactive material. Neither of these materials can be used directly as a nuclear fuel, because they are not "fissile” materials.

However, both uranium-238 and thorium-232 are "fertile" materials, which means that IF they are placed in the core of a nuclear reactor (one that is of necessity fuelled by some other material -- a fissile material), some fraction of those fertile atoms will be transmuted into man-made fissile atoms.

Inside a nuclear reactor, some uranium-238 atoms will get transmuted into plutonium-239 atoms, and some thorium-232 atoms will get transmuted into uranium-233 atoms.

Both plutonium-239 and uranium-233 are fissile materials which are not naturally-occurring. They are both usable as either fuel for nuclear reactors or as nuclear explosive materials for bombs.

In "Operation Teapot", the USA exploded an atomic bomb made from uranium-233 in 1955.

Reprocessing of irradiated nuclear fuel

In general, to obtain quantities of plutonium-239 or uranium-233, it has been necessary to "reprocess" the irradiated material that started out as uranium-238 or thorium-232. This means dissolving that irradiated material in acid and then chemically separating out the fissile plutonium-239 or uranium-233, leaving behind the liquid radioactive wastes which include dozens of fission products (broken pieces of split atoms, including such things as iodine-131, cesium-137, strontium-90, etc.) and other radioactive waste materials called "activation products" and "transuranic elements".

Reprocessing is the dirtiest process in the entire nuclear fuel chain, because of the gaseous radioactive releases, liquid radioactive discharges, and large quantities of highly dangerous and easily dispersible radioactive liquids. Reprocessing also poses great proliferation risks because it produces man-made fissile materials which can be incorporated into nuclear weapons of various kinds by anyone who acquires the separated fissile material.

Advanced Fuel Cycles and Breeders

Any nuclear reactor-fuelling regime that requires reprocessing, or that uses plutonium-239 or uranium-233 as a primary reactor fuel, is called an "advanced fuel cycle". These advanced fuel cycles are intimately related with the idea of a "breeder" reactor -- one which creates as much or more fissile material as a byproduct than the amount of fissile material used to fuel the reactor. So it is only in this context (the context of "breeders" or "near-breeders") that thorium reactors make any sense at all -- like all breeder concepts, they are intended to extend the fuel supply of nuclear reactors and thus prolong the nuclear age by centuries.

The breeder concept is very attractive to those who envisage a virtually limitless future for nuclear reactors, because the naturally occurring uranium-235 supply is not going to outlast the oil supply. Without advanced fuel cycles, nuclear power is doomed to be just a "flash in the pan". Thorium reactors are most enthusiastically promoted by those who see "plutonium breeders" as the only other realistic alternative to bring about a long-lived nuclear future. They think that thorium-232/uranium-233 is a better fate than uranium-238/plutonium-239. They do not see a nuclear phaseout as even remotely feasible or attractive.

There have been many incarnations of the thorium reactor concept over the last seventy years, some imaginary and some real. The latest version -- the Liquid Molten Salt version -- theoretically reduces the amount of reprocessing needed, although it does require reprocessing to get it started. This conceptual technology is being strongly promoted in the wake of the Fukushima disaster combined with the disappointing non-performance of the so-called "nuclear renaissance". It is important to note that no one has built and operated such a reactor in a commercial context, or even as a pilot project.

"Molten Salt" reactors

Molten salt reactors are not a new idea, and they do not in any way require the use of thorium -- although historically the two concepts have often been linked. The basic idea of using molten salt instead of water (light or heavy water) as a coolant has a number of distinct advantages, chief of which is the ability to achieve much higher temperatures (650 deg. C instead of 300 deg. C) than with water-cooled reactors, and at a much lower vapour pressure. The higher temperature means greater efficiency in converting the heat into electricity, and the lower pressure means less likelihood of an over-pressure rupture of pipes, and less drastic consequences of such ruptures if and when they do occur.

Molten salt reactors were researched at Oak Ridge Tennessee throughout the 1960s, culminating in the Molten Salt Reactor Experiment (MSRE), producing 7.4 megawatts of heat but no electricity. It was an early prototype of a thorium breeder reactor, using uranium and plutonium as fuels but not deploying the "thorium blanket" which would have been used to "breed" uranium-233 to be recovered through reprocessing -- the ultimate intention of the design.

This Oak Ridge work was based on the assumption that two separate reprocessing plants would be required -- one to extract plutonium and the other to extract uranium-233 from irradiated nuclear fuel. The work culminated in the period from 1970-76 in a design for a Molten Salt Breeder Reactor (MSBR) using thorium as a "fertile material" to breed "fissile" uranium-233, which would ultimately be extracted using a reprocessing facility.

Molten Salt Thorium reactors without reprocessing?

Although it is theoretically possible to imagine a molten-salt reactor design where the thorium-produced uranium-233 is immediately used as a reactor fuel without any actual reprocessing, such reactor designs are very inefficient in the "breeding" capacity and therefore pose financial disincentives of a serious nature to any would-be developer. No one had actually built such a reactor or had aspirations to build one (until this year, when the Chinese government expressed its intentions to investigate the technology) because it just didn't seem worth it compared with those designs which incorporate a reprocessing facility.

Here's what Wikipedia says on this matter (it happens to be good info):

http://en.wikipedia.org/wiki/Molten\_salt\_reactor

To exploit the molten salt reactor's breeding potential to the fullest, the reactor must be co-located with a reprocessing facility. Nuclear reprocessing does not occur in the U.S. because no commercial provider is willing to undertake it. The regulatory risk and associated costs are very great because the regulatory regime has varied dramatically in different administrations. [20] UK, France, Japan, Russia and India currently operate some form of fuel reprocessing.

Some U.S. Administration departments have feared that fuel reprocessing in any form could pave the way to the plutonium economy with its associated proliferation dangers.[21]

A similar argument led to the shutdown of the Integral Fast Reactor project in 1994. [22] The proliferation risk for a thorium fuel cycle stems from the potential separation of uranium-233, which might be used in nuclear weapons, though only with considerable difficulty.

Currently the Japanese are working on a 100-200 MWe molten salt thorium breeder reactor, using technologies similar to those used at Oak Ridge, but the Japanese project seems to lack funding. India is pursuing thorium near-breeder technology of a more conventional kind with full reprocessing capabilities, dating back to Canadian plans in the 1970s that never saw the light of day. (In fact, India has been trying to develop a thorium breeder fuel cycle for decades but has not yet done so commercially.)

However, a few weeks before the tsunami struck Fukushima's uranium reactors and shattered public faith in nuclear power, China revealed that it was launching a R&D program to develop a molten salt reactor design that would use liquid thorium-fluoride (ThF4) fuel as well, and that would not require reprocessing after the initial fuelling.

But this is by no means an off-the-shelf technology. The optimism and zeal exhibited by its proponents is based not only on technological considerations, but is also driven by a sense of "nuclear fatalism" (that civilization cannot survive without nuclear energy) combined with a heady air of "engineering euphoria" that often accompanies such an attitude.

Thorium reactors do not eliminate problems

The bottom line is this. Thorium reactors still produce high-level radioactive waste. They still pose problems and opportunities for the proliferation of nuclear weapons. They still present opportunities for catastrophic accident scenarios -- as potential targets of terrorist or military attack, for example.

#### 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 CP

#### Text: The United States Federal Government should fully fund and expedite renewable energy generation, generator retrofits, and micro-grids for its installations based on the Smart Power Infrastructure Demonstration for Energy Reliability and Security program.

#### The SPIDERS system solves energy islanding and cyber-terror via diverse fuel sources, smart micro-grids, and design around anti-terror technology

Ackerman 12—Robert K. Ackerman has been the editor in chief of SIGNAL Magazine for more than a dozen years, seasoned technology journalist, served as a war correspondent covering the Iraq War embedded with the U.S. Army’s 101st Airborne Division, “Cybersecurity and a power supply come together on local bases,” http://www.afcea.org/content/?q=node/2877]

No man may be an island, but each U.S. military base may become an energy island if a joint project among the Department of Energy, the Department of Homeland Security and the Defense Department comes to fruition. The effort aims to develop a microgrid that would supply a base with internal power independent of any external source that might fail as a result of enemy action.

Network security would be a key element of this energy microgrid. Facing the possibility of a cyberattack on the nation’s power grid, military bases must be able to sustain internal power with a degree of immunity from the online tactics employed by cybermarauders.

This program also seeks to blend a host of conventional and alternative energy sources into a single entity that would respond seamlessly to internal base power demands. Complicating the endeavor to link these energy sources is the requirement to provide secure network control that could interoperate with the public power grid but still be immune to cyberthreats that menace the larger network.

Known as the Smart Power Infrastructure Demonstration for Energy Reliability and Security, or SPIDERS, the project is a Defense Department joint capability technology demonstration (JCTD). It already is underway at Joint Base Pearl Harbor-Hickam, Oahu, Hawaii, and later phases will evaluate progressively sophisticated systems at Fort Collins, Colorado, and Camp Smith, Hawaii.

Melanie Johnson, an electrical engineer with the Army Corps of Engineers Construction Engineering Research Laboratory, explains that SPIDERS is designed to develop a template for bringing microgrid technology to military installations in the United States. Its success would have implications for installations outside the United States, particularly in operational settings, she points out.

Part of the SPIDERS technical management team, Johnson explains that a key element in SPIDERS is to provide network security for the communications and control systems within that microgrid environment. That security would be vital if a base loses power because of a cyberattack on the local power grid.

What sets SPIDERS apart from other microgrid efforts is its emphasis on cybersecurity and network communications. Security is a primary SPIDERS objective, Johnson says, adding that this includes information assurance certification and implementing emerging standards from the National Institute of Standards and Technology (NIST), the North American Electric Reliability Corporation (NERC) and Department of Energy organizations.

Adding cybersecurity to the microgrid complicates the picture and requires “a little critical thinking,” Johnson observes. However, SPIDERS is not employing the traditional approach of first developing a control system and then overlaying security. Instead, security will be integrated into the system as it is developed. The result will be a comprehensive security solution that is tailored to the system, she offers.

The microgrid control system continually will monitor power quality and conditions in the regional power grid. If it detects instability or significant quality issues, it can alert monitors who would decide to disconnect the base from the external grid. The microgrid would continue to provide power to critical missions.

### 1NC DA 2

#### Obama pushing immigration NOW – should pass – avoiding political divisions key. Guns and Money fights now won’t thump it. Fighting for high-skilled workers, path to citizenship, and a guest worker program

PRESTON 1 – 12 – 13 NYT Staff [Julia Preston, Obama Will Seek Citizenship Path in One Fast Push, http://www.nytimes.com/2013/01/13/us/politics/obama-plans-to-push-congress-on-immigration-overhaul.html?\_r=0]

President Obama plans to push Congress to move quickly in the coming months on an ambitious overhaul of the immigration system that would include a path to citizenship for most of the 11 million illegal immigrants in the country, senior administration officials and lawmakers said last week.

Mr. Obama and Senate Democrats will propose the changes in one comprehensive bill, the officials said, resisting efforts by some Republicans to break the overhaul into smaller pieces — separately addressing young illegal immigrants, migrant farmworkers or highly skilled foreigners — which might be easier for reluctant members of their party to accept.

The president and Democrats will also oppose measures that do not allow immigrants who gain legal status to become American citizens one day, the officials said.

Even while Mr. Obama has been focused on fiscal negotiations and gun control, overhauling immigration remains a priority for him this year, White House officials said. Top officials there have been quietly working on a broad proposal. Mr. Obama and lawmakers from both parties believe that the early months of his second term offer the best prospects for passing substantial legislation on the issue.

Mr. Obama is expected to lay out his plan in the coming weeks, perhaps in his State of the Union address early next month, administration officials said. The White House will argue that its solution for illegal immigrants is not an amnesty, as many critics insist, because it would include fines, the payment of back taxes and other hurdles for illegal immigrants who would obtain legal status, the officials said.

The president’s plan would also impose nationwide verification of legal status for all newly hired workers; add visas to relieve backlogs and allow highly skilled immigrants to stay; and create some form of guest-worker program to bring in low-wage immigrants in the future.

A bipartisan group of senators has also been meeting to write a comprehensive bill, with the goal of introducing legislation as early as March and holding a vote in the Senate before August. As a sign of the keen interest in starting action on immigration, White House officials and Democratic leaders in the Senate have been negotiating over which of them will first introduce a bill, Senate aides said.

“This is so important now to both parties that neither the fiscal cliff nor guns will get in the way,” said Senator Charles E. Schumer of New York, a Democrat who is a leader of the bipartisan discussions.

A similar attempt at bipartisan legislation early in Mr. Obama’s first term collapsed amid political divisions fueled by surging public wrath over illegal immigration in many states. But both supporters and opponents say conditions are significantly different now.

Memories of the results of the November election are still fresh here. Latinos, the nation’s fastest-growing electorate, turned out in record numbers and cast 71 percent of their ballots for Mr. Obama. Many Latinos said they were put off by Republicans’ harsh language and policies against illegal immigrants.

After the election, a host of Republicans, starting with Speaker John A. Boehner, said it was time for the party to find a more positive, practical approach to immigration. Many party leaders say electoral demographics are compelling them to move beyond policies based only on tough enforcement.

Supporters of comprehensive changes say that the elections were nothing less than a mandate in their favor, and that they are still optimistic that Mr. Obama is prepared to lead the fight.

“Republicans must demonstrate a reasoned approach to start to rebuild their relationship with Latino voters,” said Clarissa Martinez de Castro, the director of immigration policy at the National Council of La Raza, a Latino organization. “Democrats must demonstrate they can deliver on a promise.”

Since the election, Mr. Obama has repeatedly pledged to act on immigration this year. In his weekly radio address on Saturday, he again referred to the urgency of fixing the immigration system, saying it was one of the “difficult missions” the country must take on.

#### 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.

#### Plan costs capital

Schmid 11— Sonja Schmid, Assistant professor in Science and Technology Studies at Virginia Tech [Ross Carper (rosscarper@gmail.com), a writer based in Washington state, is the founding editor of the creative nonfiction project BeyondtheBracelet.com. [“The Little Reactor That Could?” Issues in Science and Technology, http://www.issues.org/27.4/carper.html]

Historically, nuclear energy has been entangled in one of the most polarizing debates in this country. Promoters and adversaries of nuclear power alike have accused the other side of oversimplification and exaggeration. For today’s industry, reassuring a wary public and nervous government regulators that small reactors are completely safe might not be the most promising strategy. People may not remember much history, but they usually do remember who let them down before. It would make more sense to admit that nuclear power is an inherently risky technology, with enormous benefits that might justify taking these risks. So instead of framing small reactors as qualitatively different and “passively safe,” why not address the risks involved head-on? This would require that the industry not only invite the public to ask questions, but also that they respond, even—or perhaps especially—when these questions cross preestablished boundaries. Relevant historical experience with small compact reactors in military submarines, for example, should not be off limits, just because information about them has traditionally been classified.

#### 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 Shipping

#### No commercialization—NRC restrictions are the single biggest roadblock for SMRs—delays, lack of human and technical capacity, and zoning restrictions.

Nick Cunningham, October 2012. Policy Analyst for Energy and Climate at the American Security Project. “Small Modular Reactors: A Possible Path Forward for Nuclear Power,” American Security Project, <http://americansecurityproject.org/ASP%20Reports/Ref%200087%20-%20Small%20Modular%20Reactors.pdf>.

The most difficult challenge currently facing SMRs is the institutional barriers. Currently, the Nuclear Regulatory Commission has not certified a single SMR design. Despite the variety of SMR designs from several nuclear vendors, the NRC has lacked sufficient human and technical capacity to license small modular reactors in the past.33 Even as policymakers have expressed greater interest in SMRs in recent years, the licensing process for a new design takes several years at a cost of hundreds of millions of dollars.34¶ Also, many regulations create a difficult environment for small reactors and favor large reactors. For example, the NRC requires 10 mile emergency planning zones around nuclear power plants,¶ making it difficult to site a small reactor near urban centers where it could be used for energy applications other than centralized electricity generation.35¶ SMRs will need to overcome this long history of institutional bias towards large reactors. As the most prominent licensing body for the nuclear industry worldwide, the NRC to a certain degree, shapes the global future for nuclear power. If the NRC does not lead on small modular reactors, it may be an uphill battle for the SMR industry.

### Hawaii

#### Reactors are still in the research stage—they are decades away from being deployable.

Anderson 10—Senior Engineer in the Integrated Applications Office @ National Renewable Energy Laboratory [Kate Anderson “SMALL NUCLEAR REACTORS,” White Paper, February 1, 2010]

Despite these benefits, small reactors have many challenges to overcome. A few designs are in the engineering phase and could be commercialized within a decade, but most designs are still in the research stage, and will require extensive engineering and demonstration before they are ready to be commercialized. The unique design features that make small reactors appealing, like passive safety systems and integral designs, require non-traditional components that will need to be fully developed, tested, and demonstrated. Additional developments in instrumentation and control will be needed for most small reactor designs. Designs that depart from the traditional light water reactortechnology may required significant material and fuel qualification as well, which could take 10-12 years or more.9 pg. 3-4

### Hydrogen

#### Zero chance of hydrogen-based military fuels being viable for decades

James T. Bartis 11, senior policy researcher at the RAND Corporation, and Lawrence Van Bibber, researcher, RAND Corporation, 2011, “Alternative Fuels for Military Applications,” http://www.rand.org/content/dam/rand/pubs/monographs/2011/RAND\_MG969.pdf

Nuclear, solar, and wind energy technologies may offer important benefits in the production of military, as well as civilian, alternative fuels. Nuclear, wind, and solar energy offer electric power without emitting appreciable amounts of greenhouse gases. For the near- and mid-term alternative fuel options (i.e., hydrotreated oil from animal fats and vegetable oils, and FT liquids), electric power is not an important input to the production process. Electric power, however, can be used to produce hydrogen via electrolysis of water, and hydrogen is an important input. For example, hydrogen produced from nuclear or renewable power can be used to hydrotreat renewable oils produced from seed crops. If sufficient hydrogen is available, nearly all of the carbon in the coal or biomass feedstock to a Fischer-Tropsch plant would end up in the fuel products and not in the air, eliminating the need to capture and sequester carbon dioxide. In addition, the use of hydrogen in an FT plant could nearly triple yields of liquid fuels.

For hydrotreated oil from algae, a longer-term option, climate-friendly sources of electric power could be used directly in the processes of cultivating the algae and extracting the oil, because electricity is required for mixing, circulation, and management of water and nutrients.

But the beneficial hydrogen derived from nuclear, solar, and wind energy technologies is not an economically viable option over the near- to mid-term. The trade-off is cost: Producing hydrogen from clean sources in capacities large enough to gain the benefits described above requires very large amounts of generating capacity and would significantly increase the costs of producing liquid fuels. Considering the importance of reducing greenhouse gas emissions during the process of generating electric power for traditional uses, investments in climate-friendly power generation are already likely to be very high over the coming decades. In this context, the additional investment required to construct large amounts of generating capacity dedicated to producing alternative fuels is probably not feasible. For at least the next two decades, it is highly unlikely that hydrogen from nuclear or renewable electric-generating technologies will be a commercially viable option for producing alternative fuels.

#### Drones suck—undermine credibility & boost recruitment

Cavallaro et al. 12—professor of law & founding director of Stanford Law School's International Human Rights and Conflict Resolution Clinic [James Cavallaro, http://livingunderdrones.org/report-strategy/]

Strategic Considerations

The central justification for US drone strikes is that they are necessary to make the US safer by disrupting militant activity. Proponents argue that they are an effective, accurate, and precise tool to that end. However, serious questions have been raised about the accuracy and efficacy of strikes, and the publicly available evidence that they have made the US safer overall is ambiguous at best. Considerable costs also have been documented. The under-accounted-for harm to civilians///

–injuries, killings, and broad impacts on daily life, education, and mental health–was analyzed in detail above, and must be factored as a severe cost of the US program.[1] In addition, it is clear that US strikes in Pakistan foster anti-American sentiment and undermine US credibility not only in Pakistan but throughout the region. There is strong evidence to suggest that US drone strikes have facilitated recruitment to violent non-state armed groups, and motivate attacks against both US military and civilian targets. Further, current US targeted killing and drone strike practices may set dangerous global legal precedents, erode the rule of law, and facilitate recourse to lethal force.

A significant rethinking of current policies, in light of all available evidence, the concerns of various stakeholders, and short and long-term costs and benefits, is long overdue.

## \*\*\* 2NC

### AT: Licensing Blocks Thorium

#### DOD support can push new designs through NRC licensing. Also, deployment on military bases can provide information to make licensing easier and reduce fears of deployment.

Loudermilk 11 [Micah K. Loudermilk, Contributor Micah J. Loudermilk is a Research Associate for the Energy & Environmental Security Policy program with the Institute for National Strategic Studies at National Defense University, contracted through ASE Inc, “Small Nuclear Reactors and US Energy Security: Concepts, Capabilities, and Costs”, http://www.ensec.org/index.php?option=com\_content&view=article&id=314:small-nuclear-reactors-and-us-energy-security-concepts-capabilities-and-costs&catid=116:content0411&Itemid=375, May 31, 2011, Chetan]

Concerns over reactor safety and security are alleviated by the security already present on installations and the military’s long history of successfully operating nuclear reactors without incident. Unlike reactors on-board ships, small reactors housed on domestic bases would undoubtedly be subject to Nuclear Regulatory Commission (NRC) regulation and certification, however, with strong military backing, adoption of the reactors may prove significantly easier than would otherwise be possible. Additionally, as the reactors become integrated on military facilities, general fears over the use and expansion of nuclear power will ease, creating inroads for widespread adoption of the technology at the private utility level. Finally, and perhaps most importantly, action by DOD as a “first mover” on small reactor technology will preserve America’s badly struggling and nearly extinct nuclear energy industry. The US possesses a wealth of knowledge and technological expertise on SMRs and has an opportunity to take a leading role in its adoption worldwide. With the domestic nuclear industry largely dormant for three decades, the US is at risk of losing its position as the global leader in the international nuclear energy market. If the current trend continues, the US will reach a point in the future where it is forced to import nuclear technologies from other countries—a point echoed by Secretary Chu in his push for nuclear power expansion. Action by the military to install reactors on domestic bases will guarantee the short-term survival of the US nuclear industry and will work to solidify long-term support for nuclear energy. Conclusions In the end, small modular reactors present a viable path forward for both the expansion of nuclear power in the US and also for enhanced US energy security. Offering highly safe, secure, and proliferation-resistant designs, SMRs have the potential to bring carbon-free baseload distributed power across the United States. Small reactors measure up with, and even exceed, large nuclear reactors on questions of safety and possibly on the financial (cost) front as well. SMRs carry many of the benefits of both large-scale nuclear energy generation and renewable energy technologies. At the same time, they can reduce US dependence on fossil fuels for electricity production—moving the US ahead on carbon dioxide and GHG reduction goals and setting a global example. While domestic hurdles within the nuclear regulatory environment domestically have proven nearly impossible to overcome since Three Mile Island, military adoption of small reactors on its bases would provide energy security for the nation’s military forces and may create the inroads necessary to advance the technology broadly and eventually lead to their wide-scale adoption.

#### Military has independent regulatory authority

Kirk Sorensen, 5/28/2011. MA aerospace engineering from the Georgia Institute of Technology and is studying nuclear engineering at the University of Tennessee under Dr. Laurence Miller. He worked at NASA's Marshall Space Flight Center from 2000 to 2010 and led advanced technology development for new space transportation systems. From May 2010 to May 2011 he served as Chief Nuclear Technologist to Teledyne Brown Engineering in Huntsville. “Kirk Sorensen: Thorium Could Be Our Energy "Silver Bullet",” Financial Sense, http://www.financialsense.com/financial-sense-newshour/big-picture/2011/05/28/03/kirk-sorensen/thorium-could-be-our-energy-silver-bullet.

Kirk: (22:42) Well, the Nuclear Regulatory Commission regulates all of our civilian reactors and they operate in a fee recovery mode. Where the monies that it takes to run the operations come from fees charged in existing reactors. And that operational mode this has been something that's been a concern to a number of people that have looked at developing new nuclear reactors, because there's just not a lot of funds left over to do the preparatory regulatory research needed to ready ourselves for the use of new kinds of nuclear reactors. There is, as you mentioned, another way to develop nuclear power plants and that is using military regulations. The US military has had independent regulatory authority for a number years. Now those will be reactors that would be on military facilities accomplishing the goals of generating power for those facilities. This has been a topic of great interest, especially to the U.S. Army for many years. And it is something that we are very focused on, in supporting that goal. I spent several years when I was at NASA on an assignment to the Army Space and Missile Defense Command. I learned about their energy needs at remote sites and also at facilities across the country. The notion of what is called “base islanding” which means that you want each military base to have independent power generation. That has been a military objective of significant importance for quite some time. And we’re not the only ones to be looking at that, but I think we got a great story for how LFTRs (liquid fluoride thorium reactors) can help the US military achieve its goals of a base islanding. We've got about 200 facilities in this country that would probably be, that would qualify for the need for base islanding. And that represents a significant initial market that would be fulfilled under military regulatory authority before you would necessarily need to undertake the issue of going with the civilian regulatory authority. So that’s a big part of our goals, is to go and help the U.S. Army meet it’s goals for base islanding with the, with the small safe modular reactor that can provide the power they need at an affordable price.

#### DOD can get around the NRC in the short-term, and their deployment will also make commercial licensing of thorium SMRs easier.

CSPO, June 2010. Consortium for Science, Policy and Outcomes at ASU. “Four policy principles for energy innovation & climate change: a synthesis,” <http://www.catf.us/resources/publications/files/Synthesis.pdf>.

Government purchase of new technologies is a powerful way to accelerate innovation through increased demand (Principle 3a). We explore how this principle can be applied by considering how the DoD could purchase new nuclear reactor designs to meet electric power needs for DoD bases and operations. Small modular nuclear power reactors (SMRs), which generate less than 300 MW of power (as compared to more typical reactors built in the 1000 MW range) are often listed as a potentially transformative energy technology. While typical traditional large-scale nuclear power plants can cost five to eight billion dollars, smaller nuclear reactors could be developed at smaller scale, thus not presenting a “bet the company” financial risk. SMRs could potentially be mass manufactured as standardized modules and then delivered to sites, which could significantly reduce costs per unit of installed capacity as compared to today’s large scale conventional reactor designs. It is likely that some advanced reactors designs—including molten salt reactors and reactors utilizing thorium fuels—could be developed as SMRs. Each of these designs offers some combination of inherently safe operation, very little nuclear proliferation risk, relatively small nuclear waste management needs, very abundant domestic fuel resources, and high power densities—all of which are desirable attributes for significant expansion of nuclear energy. Currently, several corporations have been developing small nuclear reactors. Table 2 lists several of these companies and their reactor power capacities, as well as an indication of the other types of reactor innovations that are being incorporated into the designs. Some of these technologies depend on the well-established light water reactor, while others use higher energy neutrons, coolants capable of higher temperature operation, and other innovative approaches. Some of these companies, such as NuScale, intend to be able to connect as many as 24 different nuclear modules together to form one larger nuclear power plant. In addition to the different power ranges described in Table 2, these reactors vary greatly in size, some being only 3 to 6 feet on each side, while the NuScale reactor is 60 feet long and 14 feet in diameter. Further, many of these reactors produce significant amounts of high-temperature heat, which can be harnessed for process heating, gas turbine generators, and other operations. One major obstacle is to rapid commercialization and development are prolonged multi-year licensing times with the Nuclear Regulatory Commission. Currently, the NRC will not consider a reactor for licensing unless there is a power utility already prepared to purchase the device. Recent Senate legislation introduced by Senator Jeff Bingaman (D-NM) has pushed for DOE support in bringing down reactor costs and in helping to license and certify two reactor designs with the NRC. Some additional opportunities to facilitate the NRC licensing process for innovative small modular reactors would be to fund NRC to conduct participatory research to get ahead of potential license applications (this might require ~$100million/year) and potentially revise the current requirement that licensing fees cover nearly all NRC licensing review costs. One option for accelerating SMR development and commercialization, would be for DOD to establish SMR procurement specifications (to include cost) and agree to purchase a sufficient amount of SMR’s to underwrite private sector SMR development. Of note here may be that DARPA recently (3/30/10) issued a “Request for Information (RFI) on Deployable Reactor Technologies for Generating Power and Logistic Fuels”2 that specifies may features that would be highly desirable in an advanced commercial SMR. While other specifications including coproduction of mobility fuel are different than those of a commercial SMR power reactor, it is likely that a core reactor design meeting the DARPA inquiry specifications would be adaptable to commercial applications. While nuclear reactors purchased and used by DOD are potentially exempt from many NRC licensing requirements3, any reactor design resulting from a DOD procurement contract would need to proceed through NRC licensing before it could be commercially offered. **Successful use of procured SMR’s for DOD purposes could provide the knowledge and operational experience needed to aid NRC licensing and it might be possible for the SMR contractor to begin licensing at some point in the SMR development process**4. Potential purchase of small modular nuclear reactors would be a powerful but proven way in which government procurement of new energy technologies could encourage innovation. Public procurement of other renewable energy technologies could be similarly important.

### 2NC Theory/AT: PICs Bad

#### 2. Education—discussions of nuclear power are meaningless without considering reactor specifics and fuel cycle.

MIT, 2011. “The Future of Nuclear Power”, Chapter 4—Fuel Cycles, 2011, <http://web.mit.edu/nuclearpower/pdf/nuclearpower-ch4-9.pdf>.

The description of a possible global growth scenario for nuclear power with 1000 or so GWe deployed worldwide must begin with some specification of the nuclear fuel cycles that will be in operation. The nuclear fuel cycle refers to all activities that occur in the production of nuclear energy. It is important to emphasize that producing nuclear energy requires more than a nuclear reactor steam supply system and the associated turbine-generator equipment required to produce electricity from the heat created by nuclear fission. The process includes ore mining, enrichment, fuel fabrication, waste management and disposal, and finally decontamination and decommissioning of facilities. **All steps in the process must be specified, because each involves different technical, economic, safety, and environmental consequences**. A vast number of different fuel cycles appear in the literature, and many have been utilized to one degree or another. We review the operating characteristics of a number of these fuel cycles, summarized in Appendix 4. In this report, our concern is not with the description of the technical details of each fuel cycle. Rather, we stress the importance of aligning the different fuel cycle options with the global growth scenario criteria that we have specified in the last section: cost, safety, nonproliferation, and waste. This is by no means an easy task, because objective quantitative measures are not obvious, there are great uncertainties, and it is difficult to harmonize technical and institutional features. Moreover, different fuel cycles will meet the four different objectives differently, and therefore the selection of one over the other will inevitably be a matter of judgment. All too often, advocates of a particular reactor type or fuel cycle are selective in emphasizing criteria that have led them to propose a particular candidate. We believe that detailed and thorough analysis is needed to properly evaluate the many fuel cycle alternatives. We do not believe that a new technical configuration exists that meets all the criteria we have set forth, e.g. there is not a technical ‘silver bullet’ that will satisfy each of the criteria. Accordingly, the choice of the best technical path requires a judgment balancing the characteristics of a particular fuel cycle against how well it meets the criteria we have adopted. Our analysis separates fuel cycles into two classes: “open” and “closed.” In the open or once-through fuel cycle, the spent fuel discharged from the reactor is treated as waste. See Figure 4.1. In the closed fuel cycle today, the spent fuel discharged from the reactor is reprocessed, and the products are partitioned into uranium (U) and plutonium (Pu) suitable for fabrication into oxide fuel or mixed oxide fuel (MOX) for recycle back into a reactor. See Figure 4.2. The rest of the spent fuel is treated as high-level waste (HLW). In the future, closed fuel cycles could include use of a dedicated reactor that would be used to transmute selected isotopes that have been separated from spent fuel. See Figure 4.3. The dedicated reactor also may be used as a breeder to produce new fissile fuel by neutron absorption at a rate that exceeds the consumption of fissile fuel by the neutron chain reaction.2 In such fuel cycles the waste stream will contain less actinides,3 which will significantly reduce the long-term radioactivity of the nuclear waste.4

### 2NC Permutation—Do CP

#### The DOE defines SMRs as any reactor producing less than 300 megawatts of power. The aff chose this term of art for their plan.

[Jeff McMahon](http://blogs.forbes.com/jeffmcmahon/), 5/23/2012. Forbes green-tech contributor. “Small Modular Nuclear Reactors By 2022 -- But No Market For Them,” Forbes, http://www.forbes.com/sites/jeffmcmahon/2012/05/23/small-modular-reactors-by-2022-but-no-market-for-them/.

DOE **defines reactors as SMRs if they generate less than 300 megawatts of power**, sometimes as little as 25 MW, compared to conventional reactors which may produce more than 1,000 MW. Small modular reactors can be constructed in factories and installed underground, which improves containment and security but may hinder emergency access.

### LFTR = SMR

#### LFTRs would be SMRs.

Robert Kientz, 5/28/2012. Investment Analyst for Seeking Alpha. “Capitalizing On The Energy Scarcity Myth,” Seeking Alpha, http://seekingalpha.com/article/620551-capitalizing-on-the-energy-scarcity-myth.

One of the greatest benefits of the LFTR design is scalability. A megawatt design could be shipped on a truck and requires no site-built containment dome or cooling systems. LFTR can be cooled passively and constructed on site in varying sizes. Californians have an energy crisis? Just ship a few of the smaller reactors and setup where necessary, not a problem! LFTR would become both affordable and available to much of the world's population where other energy solutions are not.

### 2NC Permutation—Do Both

#### Commercialized thorium would out-compete light-water designs because of cheaper fuel inputs.

Richard Martin, 5/8/2012. Contributing editor for Wired since 2002, he has written about energy, for Time, Fortune, The Atlantic, and the Asian Wall Street Journal, editorial director for Pike Research, the leading cleantech research and analysis firm. “SuperFuel: Thorium, the Green Energy Source for the Future,” ISBN 978—0»230-116474.

SO, IF YOU WERE GOING TO DESIGN and build a new nuclear reactor from scratch, what would it look like? First of all, you’d make it small. The old antinuke saw says, “Nuclear reactors come in only one size: extra large.” But compact modular reactors that can be prefabricated, transported by shipping container, and assembled on site are now seen by many experts as the future of nuclear energy. “If you go small, and manufacture reactors like Henry Ford did cars, there’s a host of advantages,” Tom Sanders told me shortly before he took over as president of the American Nuclear Society in 2009. (He is now its president emeritus.) “You could use automated manufacturing processes instead of doing every weld individually, you could get the plants licensed in a two-year time frame instead of seven, and it’d be much cheaper on a per-kilowatt basis.” Virtually all the major nuclear vendors, including GE-Hitachi Nuclear Energy, Bechtel (a company not exactly renowned for miniaturization), Babcock & Wilcox, and Westinghouse (now owned by the Korean tech giant Toshiba) are developing small modular reactors (SMRs). These reactors can use uranium or thorium (or even plutonium), but **thorium, with its higher efficiency, offers unique qualities that make it well suited for miniaturization**. They produce less than 300 megawatts, the limit for an officially small reactor. Future versions that could fit on the back of a flatbed truck are envisioned at 60 or even 30 megawatts. Like mobile homes, SMRs can be manufactured centrally and assembled on site, facilitating financing and shortening the time to production; in theory, multiple SMRs could be combined to create a large generating station. Keeping the plants small and dispersed, though, makes them less tempting targets for would-be terrorists—as does fueling them with thorium. More important, **they could produce energy at a lower price per kilowatt than conventional nuclear plants**, bringing the cost of nuclear power more into line with low-cost coal production. Newly infatuated with what’s known as distributed power generation (lots of smaller reactors scattered in lots of places), the nuclear industry has finally realized that bigger is not always better. More compact and more affordable are good things; even better is the prospect that thorium-powered SMRs could help solve the problem of nuclear waste storage and disposal. Some ambitious nuclear designers have even started to dream up small, modular fast breeder reactors, which is a bit like trying to control a tiger by putting it in a smaller cage. Bringing these designs into commercial production could take a decade or more. The three main barriers to widespread deployment, as Philip Moor puts it, are the same that face any new nuclear plant: “Dirt, licensing, and money,” he told me. Moor heads up a special committee of the American Nuclear Society formed to examine the business and manufacturing issues around SMRs. The Savannah River Site, a nuclear industrial complex operated by the DOE near Augusta, Georgia, will supply the dirt (the real estate and infrastructure), and industry heavyweights like GE, Westinghouse, and Bechtel are lining up to provide the money, at least for demonstration projects. That leaves licensing. “Once we start the demonstration projects, we can start pursuing the license application,” said Sanders of the American Nuclear Society. But “we need something operating on the ground.” That’s hardly a slam dunk. It’s worth noting that building minireactors is not a new concept. GE actually started the Power Reactor Innovation Small Modular (PRISM) program back in 1981, and in 1994 the NRC issued a report that said the commissioners foresaw no impediments to licensing. The project was abandoned in 2001 and then got a second life in 2006. With huge new supplies of natural gas starting to reach the market, and coal plants still the least expensive form of power generation, new nuclear plants will continue to look expensive. And investors looking back at 30 years of nuclear dead ends are sure to be wary of new technological marvels, however promising. The history of nuclear power demonstrates that nothing is truly viable until the core starts chain-reacting. Still, thorium-powered SMRs offer the best way forward for new nuclear power and a potential solution for global warming. Smaller is beautiful, and in this case it could be more profitable as well.—- SECOND, YOU’D MAKE YOUR NEW REACTOR a breeder, preferably a thermal breeder. The failure of fast breeders to fulfill their promise has not erased their appeal; it has just caused the quest for a fast breeder to go in (slightly) new directions. Breeders would be advantageous not only because, theoretically, you’d never run out of fuel, but also because you can use them to process nuclear waste from conventional reactors. At least in the United States, the question of how to store nuclear waste has no clear answer, and there may not be one for the next decade. Building self-sustaining breeder reactors would, as the nuclearati like to say, “close the fuel cycle”; little radioactive material would be left over to dispose of. Then you’d want to make your reactor inherently safe. Inherent safety — not to be confused with passive safety, a very different thing — is a term much beloved by nuclear engineers‘; It has been applied to just about every reactor design, including the uranium-fueled lightwater reactor and the sodium-cooled fast breeder, machines whose inherent safety is, to say the least, questionable. Traditionally, the solution to this problem has been external safeguards, also called overengineering: add more controls, more redundancy, more miles of piping, more plumbing and alarms and sensors and gauges, and the inherent twitchiness of the world’s most volatile energy source could be contained and controlled. Unfortunately, all that engineering brings more complexity, and complexity in itself adds risk. Virtually all the reactor accidents that have ever occurred have had one of two causes: either a fiendishly complex mechanism failed because of a simple mishap (like a loose chunk of zirconium) or a human being failed at the task of monitoring and managing a fiendishly complex mechanism. The only truly inherently safe reactor is a liquid-core reactor, like the molten salt reactor that was created at Oak Ridge in the 1960s. For the purposes of a reactor designer, liquid—whether it’s water, liquid metal, or some type of liquid fluoride — has a marvelous characteristic: it expands rapidly when it gets hot. All materials expand when heated, of course. In a liquid-core reactor, as the energy of the liquid rises, it expands and naturally, passively, slows down the reaction, making a runaway accident nearly impossible. In technical terms, this is known as a “negative temperature coefficient of reactivity.” That means that as the temperature rises (which typically is what happens when something goes wrong in a nuclear reactor), the reactivity goes down. When the reactivity goes down, the reactor is essentially turning itself off. Liquid fuels have several other characteristics that make them safer than conventional solid fuel reactors. This is where the benefits of thorium, which for a variety of reasons is uniquely well suited to liquid fuel reactors, extend beyond the nature of the element itself. No matter how you use it—in a light-water reactor, in a pebble bed reactor— thorium offers advantages over uranium. But in a liquid fuel reactor, that advantage is magnified. If you put high-octane gas in a 1975 Ford Pinto, you’ll see some marginal performance enhancement. To get the full benefit, though, you should put it in a Ferrari Testarossa. Using thorium in a liquid fuel reactor is similar: its unique qualities as an energy source are fully exploited. For example, in liquids—particularly in molten salts—fission products tend to be stable, making it easier to isolate and remove them. One of these fission products, xenon-135, is a nuclear poison that tends to build up in conventional reactors, slowing down the reactions. It renders the fuel unusable after only a small percentage of the potential energy has been used, and it’s hideously difficult to handle as part of the nuclear waste stream. In fluid fuels, because xenon forms a noble gas (one that is impervious to chemical reactions), xenon is easy to remove. In a LFTR it can be boiled off as a gas and processed while the reactor continues operating, reducing downtime and increasing the amount of the potential energy that can be extracted from the thorium fuel. A ton of thorium can produce energy equivalent to that produced by 200 tons of uranium in a conventional light-water reactor. Liquid fuels are also impervious to radiation damage, solving one of the thorniest problems in solid fuel reactors. Continuous bombardment by neutrons over periods of weeks or months wears down not only the solid uranium pellets in a light-water reactor but also the cladding (usually made of zirconium) that contains them. Because of radiation damage and the buildup of fission poisons like xenon, fuel rods age quickly; they have to be replaced every few years, even though only 3 to 5 percent of their energy has been consumed. Liquid fuels have one other characteristic that makes them ideal for reactor cores: they flow. Gravity, not elaborate control systems or socalled passive safety systems, gives LFTRs their ultimate protection against a serious nuclear accident. In a criticality accident (i.e., if the fission reaction in the core starts to get out of control), a specially designed freeze plug in the reactor vessel melts and the liquid core simply drains out of the reactor into an underground shielded container, like a bathtub when the drain plug is pulled. The fission reactions quickly cease, and (thanks to the expansive quality noted earlier) the fluid cools rapidly. Decay heat is contained harmlessly. Meltdown is impossible, and there are no solid fuel rods too radioactive to remove. Inherently safe, LFTRs pose less threat than light-water reactors, coal-fired power plants, oil refineries, or just about any other form of large energy or chemical plant. Built small and modular, they will be less expensive to build and operate than just about any other energy source.—- FINALLY YOU’D FUEL YOUR SMALL, breeding, inherently safe, liquidcore reactor with thorium. I mentioned in chapters 1 and 2 many of thorium’s sterling qualities as a nuclear fuel; they bear reviewing. It is abundant. In fact, used properly, it’s effectively inexhaustible. It requires no special refining or processing beyond purifying it from the monazite ore in which it is most commonly found. It can be mined safely, with none of the tailings and other results of uranium mining that, in the early years of the Atomic Age, poisoned whole communities in Russia and the United States. It’s no good for making weapons. In fact, it’s not fissile at all. It requires a kind of nuclear alchemy to be transmuted into uranium-233, which is a more efficient and safe source of energy than U-235. Finally reactors based on thorium—or, rather, U-233, into which thorium transforms in a nuclear reactor—consume far more of the latent energy trapped inside the fuel, vastly reducing or even eliminating the problem of nuclear waste. In short, you’d build a liquid fluoride thorium reactor, or LFTR. LFTRs are the first truly revolutionary reactor design to come along since the development in the 1960s of the molten salt reactor, progenitor of the LFTR. LFTRs are designed with an outer blanket of liquid fluoride that contains dissolved thorium-232—thorium tetrafluoride, to be precise (a fluoride is simply a combination of fluorine and another element; tetrafluoride means four atoms of fluorine). The thorium is borne in a solution of lithium and beryllium fluorides that has maximum heat-transfer properties, making it a supremely efficient coolant. This radioactive cocktail surrounds a core of uranium-233 that is produced from the natural decay of Th-232 bombarded by neutrons. The neutron source, to start the reaction, is typically a small amount of fissile uranium, although the neutrons can also come from a particle accelerator, of the sort used in physics experiments to smash particles together. The blanket and inner core are in two concentric containers. It’s essentially a double boiler: the inner core, sheathed in an exotic alloy of a metal such as zirconium, contains the fissile U-233, and the outer shell, or blanket, contains the fertile thorium. In this simplified diagram of a liquid fluoride thorium reactor, thorium is converted to uranium-233, which sustains the fission reaction, heating a secondary liquid that powers a turbine to create electricity. (Brad Nielsen) Once the reactor core goes critical, the fission reactions in the core continuously throw off neutrons that keep the thorium, in the blanket, in a constant state of transformation, creating a virtuous cycle. Such a plant has two separate loops of piping: one carries the fertile thorium tetrafluoride salt, once it has been sufficiently bombarded to start the decay chain, into a decay tank from which U-233 can be transferred to the inner core; the other sends the hot U-233 salt from the core to a heat exchanger to drive a steam turbine.7 There are several variations on this basic design, which use various fluids to transfer heat from the reactor core to the turbine; suffice it to say that whichever is chosen, it will be significantly more efficient than a conventional nuclear plant. After passing through the heat exchanger, the second loop, carrying hot U-233 fuel salt, cycles back into the core, with a small secondary side stream passing through a reprocessor, where the fission products are removed, preventing them from poisoning the reaction, before being cycled back into the core for further fission reactions. Because the core is liquid, it operates at atmospheric pressure, meaning that the extremely thick-walled, pressurized vessels used in conventional reactors, which have an unfortunate tendency to blow their top, are unnecessary. Because LFTRs consume virtually all their nuclear fuel, the majority of the waste products are not long-lived fissile material but rather fission products, about 83 percent of which are safe within a decade. While LFTRs, like every other nuclear reactor, generate fission products that are highly radioactive, their half-lives tend to be measured in dozens of years, not thousands. The long-lived radioactivity of LFTR waste is one ten-thousandth that of a conventional reactor. The leftovers, a small fraction of the waste produced by conventional reactors, must be stored in radiation-proof geological sites for about three centuries, compared with ten thousand years for nuclear waste from conventional uranium reactors. In fact, LFTRs themselves make great garbage dumps for spent nuclear fuel: they can refine standard nuclear waste into LFTR by-products, essentially solving the currently intractable toxic waste storage problems that plague today’s nuclear power industry. Thorium Energy Alliance This schematic shows a full thorium power plant including a reactor vessel, drain tanks, and a Brayton-cycle turbine using supercritical carbon dioxide. (Thorium Energy Alliance) With their high negative temperature coefficient, LFTRs are impervious to sudden overheating. They’re also exquisitely tunable; the concentration of fuel in the outer blanket can be adjusted continually, making it easy to control the reactivity in the core. Finally, they can run practically forever. The reactions in a LFTR produce enough excess neutrons to breed their own fuel. LFTRs are the only type of reactor that can breed more fuel than they consume in the thermal, or lower-energy, spectrum. They have the virtues of fast breeders without the volatility. Here it is useful to think back to the nature of fission and neutron absorption. In today’s conventional reactors, the great majority of the fuel is U-238, which transmutes to the transuranic element plutonium- 239 when the U-238 absorbs a single neutron. Thorium-232, by contrast, requires five neutrons to become a transuranic (neptunium-237, which can be safely burned down, or processed, in the reactor). That too makes LFTRS inherently safer than solid-fuel uranium reactors. While liquid-core reactors can be built to operate without moderators, in some LFTR designs the core does use moderators — typically graphite rods, just as in a conventional uranium reactor. Just as the LFTR has unique qualities that make it superior to light-water reactors, though, U-233 has some distinct advantages over uranium- 235, the fissile material that runs the vast majority of the world’s nuclear power stations today. U-233 displays a quality that nuclear engineers love: high neutron economy, usually expressed as q in physics equations. That means that an atom of U-233, after absorbing a stray neutron and fissioning, produces on average 2.16 neutrons. Since one neutron is required to continue the chain reaction, 1.16 neutrons are freed up to produce new fuel. Overall, LFTRs are 200 to 300 times more fuel efficient than standard reactors. **They are** safer, simpler, smaller, **less expensive to build, and less expensive to run to produce electricity on a cost-per-kilowatt basis**.

#### Thorium will out-compete once the government takes a first-mover action to get them over the commercialization hump.

Robert Hargraves, July 2012. Study leader for energy policy at Dartmouth ILEAD. He was chief information officer at Boston Scientific Corporation and previously a senior consultant with Arthur D. Little. Former professor of mathematics and associate director of the computation center @ Dartmouth. “THORIUM: energy cheaper than coal,” ISBN: 1478161299, purchased online at Amazon.com.

Export LFTR nuclear power plants. Simply generating inexpensive, nonpolluting LFTR power within the US is not enough to solve the global energy and environmental crises. The US should encourage exporting these small nuclear power plants because they can help the developing world end energy poverty, cut CO2 emissions globally, and become a $70 billion export industry to help the US economy. Russia, China, South Korea, and India all plan nuclear power plant exports. Lead! Who will lead? A transnational organization such as the United Nations? One nation such as the United States? Multiple state or provincial governments? Corporations? Leadership individuals? The United Nations can not solve our energy/climate crises. Dozens of IPCC-sponsored meetings only end in promises to agree and contention between rich and poor nations. Few nations will sacrifice national energy sovereignty for global good. The United States can lead in developing LFTR and thorium energy cheaper than coal. The US has the DOE national labs, the best university nuclear engineering programs, and the government/university/business tradition of entrepreneurism and commercialization. Political leadership is lacking. At the executive, congressional, and state levels elected officials fail to grasp the realities of economics, energy, environmental pollution, and global resource contention. Instead these politicians capitalize on the crowd-sourced fears of all things nuclear, and they attract feel good voters by promoting natural wind and solar energy sources, hiding the true social costs in grants, subsidies, and tax preferences that only benefit select, savvy businessmen. Yet there is an immense political opportunity for a leader to satisfy liberals and environmentalists by checking global warming and ending energy poverty, and also satisfy conservatives and businesses by avoiding carbon taxes, decreasing energy costs, and creating a new Boeing-size export industry. Governments have an opportunity to incentivize corporations to undertake LFTR research and development. Once power-plant- scale LFTRs are successfully demonstrated, and once the legal system permits, **corporations can then lead in mass production of LFTRs.** We can then rely on economic self-interest of corporations to produce and install LFTRs as fast as Boeing sells airplanes. The corporations will succeed because they can rely on the economic self-interest of 7 billion people in 250 nations to choose the cheapest source of clean, safe energy. This will end C02-emitting energy from coal and reduce demand for energy from other fossil fuels.

### 2NC Uranium Prices Link

#### Uranium demand increasing now but shift to thorium would collapse prices.

Zvi Bar, 10/24/2012. Leading authority on prudent financial trust administration and related estate planning matters, with over 15 years of experience administrating trusts. “Uranium Miners Dig The Bidding War Over Hathor's Canadian Deposits,” Seeking Alpha, http://seekingalpha.com/article/301613-uranium-miners-dig-the-bidding-war-over-hathor-s-canadian-deposits.

Several uranium providers have undergone significant equity appreciations since the start of the fourth quarter of 2011, with most starting the quarter at their 2011 and/or multi-year lows. Much of this recent appreciation appears tied to a bidding war between Cameco Corp ([CCJ](http://seekingalpha.com/symbol/ccj)) and mining powerhouse Rio Tinto ([RIO](http://seekingalpha.com/symbol/rio)) over Hathor ([HTHXF.PK](http://seekingalpha.com/symbol/hthxf.pk)), a Canadian uranium miner. Their interest in Hathor may indicate these industry experts believe now is an appropriate time to accumulate uranium assets. Since the Japanese nuclear concerns emerged at the start of 2011, following the destruction caused by an earthquake and tsunami, uranium prices began to face significant downward pressure. Due to this Japanese nuclear crisis, Germany decided to discontinue nuclear plant development and announced plans to eventually eliminate nuclear power as an energy source. Japan and Germany were previously significant users of nuclear power, and this perceived vacuum to demand weakened the price of uranium. It also weakened the shares of those companies that produce and/or provide uranium. Though many First World nations have become wary of nuclear power in the wake of the recent Japanese crisis, China and India continue to build additional nuclear power plants. In 2011, China announced plans to increase its nuclear capacity eight-fold before the end of the decade. Additionally, India has announced a 20-year plan to increase nuclear power production thirteen-fold. Other growing nations will likely follow, provided they have the capabilities to produce nuclear power. It appears almost inevitable that uranium demand from these new and sizable locations will begin to outpace uranium supply, possibly creating dramatic shortages and price spikes to both uranium and the shares of uranium producers. Some have argued, though, that the future of nuclear power may not rely upon uranium so much as thorium. **If such a switch to thorium were to occur, this could have a devastating effect on uranium prices**.

#### Thorium reactors significantly reduce uranium demand.

Charles Barton, 4/30/2012. Energy blogger. “Which is better for nuclear- Uranium or Thorium?” The Energy Collective, http://theenergycollective.com/charlesbarton/83705/uranium-or-thorium.

The use of thorium in a thermal converter reactor **will considerably decrease the demand for uranium**. Dr LeBlanc notes that a conventional LWR operating on a once through fuel cycle will require 6400 thousand tonnes of utanium ore, during a 30 year-long operating period, while a once through DMSR will use 1810 tonnes of uranium ore and a DMSR with batch reprocessing of fuel salts, and return if all utanium and trans-uranium elements to a DMSR core, will lead to only 1000 tones of uranium ore used. It is no small advantage of the DMSR that it will produce very little nuclear waste. Since return of actinide nuclear waste to a DMSR core after batch reprocessing, the remaining fission daughyrt products will become safe after 300 years. However, long before the 300 year period is up, non-radioactive daughter products, mamy of which can be used by industry, can be extracted from the waste repository. Thus the use of large ammounts of thorium in the DMSR will help to dplve the problem of uranium fuel cycle waste.

#### Demand key to prices—increasing now.

[Ken Silverstein](http://blogs.forbes.com/kensilverstein/), 9/24/2012. Forbes contributor and [Energy Central's EnergyBiz Insider](http://www.energycentral.com/). “Nuclear Energy's Limp Causing Uranium Prices to Stumble,” Forbes, http://www.forbes.com/sites/kensilverstein/2012/09/24/nuclear-energys-limp-causing-uranium-prices-to-stumble/.

When the March 2011 earthquake and tsunami knocked out Japan’s Fukushima nuclear reactors, they also took down the price of uranium. The hesitance to resume nuclear operations not only in Japan but also elsewhere in the world has caused the demand for the nuclear feedstock to diminish. Indeed, uranium prices have fallen from about $68 a pound before the nuclear crisis to $47 per pound as of September 2012, which is the lowest they have been in two years. Analysts had anticipated such a slump but had also said that the rising demand in, especially, Russia, China and India would, again, necessitate the increased development of uranium. Altogether, 95 reactors are planned in the next two decades, says Canada’s [Cameco](http://www.forbes.com/companies/cameco/) Corp., which adds that 60 are now under construction around the globe. “Overall, the uranium market conditions continues to be in wait and see mode as utilities are generally well covered for the next few years, and suppliers are similarly heavily committed,” says [Cameco, in its quarterly report to shareholders](http://www.cameco.com/media/news_releases/2012/?id=633). “However, we have seen the emergence of some long-term contracting over the past few months.”

#### Perception of government shift away from uranium would collapse prices.

The Fiscal Times, 1/12/2011. “Nuclear Power Demands Send Uranium Prices Sky High,” http://www.thefiscaltimes.com/Articles/2011/01/12/Uranium-Price-Spike-Sign-of-Confidence-for-Nuclear-Power.aspx#page1.

That global confidence is pushing up the cost of uranium, whose oscillations have historically have had **as much to do with government signals of enthusiasm as they do a classic supply-and-demand ratio**. The U.S. still is the world’s largest consumer of the radioactive element, but its recent effect on the price needle has been minimal. For worldwide energy brokers, the nation is a sleeping giant.

### 2NC Kazakh Econ U

#### Kazakh economy is very nice. I like.

EDC, September 2012. Export Development Canada, Economic and Political Intelligence Centre. “Kazakhstan Country Overview,” [www.edc.ca/EN/Country-Info/Documents/kazakhstan.pdf](http://www.edc.ca/EN/Country-Info/Documents/kazakhstan.pdf).

Country Overview: As a key energy supplier to both Europe and Asia, Kazakhstan has established itself as an influential regional player. Thanks to its buildup of FX reserves (the current account surplus is 7.2% of GDP), it was able to withstand the last global financial crisis and could do so again. GDP grew a robust 7.5% in 2011 and is forecasted to expand by 5.9% this year and 6% next. The Central Bank has been active to avoid large exchange movements this year; the tenge expected to appreciate in the medium-long-term. Inflation is set to fall from 8.3% last year to 5.6% this year as a result of a fall in global food prices. Financial sector conditions remain poor and persistently high non-performing loans continue to weigh on the domestic credit environment.

### \*\*\*AT: Military Won’t Purchase Thorium

#### Thorium developers have already received limited government support because LFTRs would meet DOD islanding requirements. Thorium just needs DOD market access to demonstrate that their designs work, which would spur broader commercialization.

Debra Fiakas, 5/11/2012. CFA, Managing Director of Crystal Equity Research. Ms. Fiakas has a bachelor degree in economics from the University of South Dakota and an MBA from Thunderbird School of Global Management. Ms. Fiakas is a member of the Chartered Financial Analyst Institute. “Nuclear Fix from Flibe,” Crystal Equity Research, http://crystalequityresearch.blogspot.com/2012/05/nuclear-fix-from-flibe.html.

Instead of providing the proverbial final nail for nuclear energy’s coffin, the disaster at Japan’s Fukushima power plant appears to have galvanized many nuclear professionals. Japan rolled the dice and lost when locating the plant so close to the sea and within the tsunami threat zone. The answer, some contend, is better nuclear reactor designs that offer higher margins of safety even for land-constrained island-nations like Japan. Enter the nuclear team at Flibe, Inc., an Alabama-based developer of small modular nuclear reactors. Flibe has been around for a while, doggedly perfecting a reactor design using molten salts such liquid-floride thorium rather than a solid fuel based on uranium. Indeed, company’s unusual name draws from the table of elements - LiF for lithium fluoride and BeF2 for beryllium fluoride. ﻿The idea of using thorium as a nuclear fuel is not new. In the early years of nuclear development the focus on wartime objectives rather than power generation took scientists and engineers down the uranium path, because their work showed thorium reactions held little promise for weapons. Our first generation nuclear power reactor designs were largely an effort to capitalize on the work already completed while building the nuclear bomb. Those somewhat myopic days are over and developers are returning to thorium alternative to uranium. One of the first attractions of thorium as a fuel is economy. It is a more common element than uranium and available worldwide. Furthermore, thorium-fueled reactors can be built out of more common materials and would require far less nuclear fuel to generate a given amount of electrical power. Taking it one step further, a design using liquid molten salts rather than solid fuel also means the nuclear reaction takes place under higher temperatures but lower pressures. Operating at lower pressures reduces the mechanical stress endured by the system and simplifies reactor design. Some even think molten salt reactors could ultimately cost less to build than coal power plants. This also means molten salt reactors offer much improved safety profile especially for operators with limited available land. If you are not sold just yet, consider also the significant reduction in nuclear waste from molten salt reactions. Now Flibe management is ready to build a prototype of its Liquid-Flouride Thorium Reactor (LFTR) - and make a big entrance into the nuclear energy market. The company has benefitted from federal government support for its development work in large part **because the military needs a viable power source off the grid and nuclear offers the discreet, closed loop profile for needed by military installations**. Proprietary energy sources will ensure domestic military installations have power in the event a natural disaster or terrorist attack disrupts commercial utility services. Management hopes to locate its first operational LFTR at the military base near Huntsville, Alabama and get operating help from the Army Corps of Engineers. Proving the value of this reactor design for military purposes and gaining military approvals would ensure a good demand source even before Flibe heads to the U.S. Nuclear Energy Agency for certification in the commercial market.

### 2NC Impact Overview

#### b. Magnitude—U.S.-Russia conflict is the only existential risk.

Nick Bostrom, 2002. Gannon Award winner, Professor of philosophy at Oxford University. http://www.nickbostrom.com/existential/risks.html.

A much greater existential risk emerged with the build-up of nuclear arsenals in the US and the USSR. An all-out nuclear war was a possibility with both a substantial probability and with consequences that might have been persistent enough to qualify as global and terminal.There was a real worry among those best acquainted with the information available at the time that a nuclear Armageddon would occur and that it might annihilate our species or permanently destroy human civilization.[4]  Russia and the US retain large nuclear arsenals that could be used in a future confrontation, either accidentally or deliberately**.** There is also a risk that other states may one day build up large nuclear arsenals. Note however that a smaller nuclear exchange, between India and Pakistan for instance, is not an existential risk, since it would not destroy or thwart humankind’s potential permanently. Such a war might however be a local terminal risk for the cities most likely to be targeted. Unfortunately, we shall see that nuclear Armageddon and comet or asteroid strikes are mere preludes to the existential risks that we will encounter in the 21st century.

## \*\*\* 1NR

### 1NR—Case

#### The military has already expressed interest in thorium reactors.

[Kalee Thompson](http://www.popsci.com/category/popsci-authors/kalee-thompson), 6/27/2011. Freelance writer who covers science, the environment, and the outdoors. She was formerly an editor at Popular Science and National Geographic . “[Concepts & Prototypes: Two Next-Gen Nukes](http://www.popsci.com/technology/article/2011-06/next-gen-nuke-designs-promise-safe-efficient-emissions-free-energy),” Popular Science, http://www.popsci.com/technology/article/2011-06/next-gen-nuke-designs-promise-safe-efficient-emissions-free-energy.

MSRs were developed at Tennessee’s Oak Ridge National Laboratory in the early 1960s and ran for a total of 22,000 hours between 1965 and 1969. “These weren’t theoretical reactors or thought experiments,” says engineer John Kutsch, who heads the nonprofit Thorium Energy Alliance. “[Engineers] really built them, and they really ran.” Of the handful of Generation IV reactor designs circulating today, only the MSR has been proven outside computer models. “It was not a full system, but it showed you could successfully design and operate a molten-salt reactor,” says Oak Ridge physicist Jess Gehin, a senior program manager in the lab’s Nuclear Technology Programs office. The MSR design has two primary safety advantages. Its liquid fuel remains at much lower pressures than the solid fuel in light-water plants. This greatly decreases the likelihood of an accident, such as the hydrogen explosions that occurred at Fukushima. Further, in the event of a power outage, a frozen salt plug within the reactor melts and the liquid fuel passively drains into tanks where it solidifes, stopping the fission reaction. “The molten-salt reactor is walk-away safe,” Kutsch says. “If you just abandoned it, it had no power, and the end of the world came--a comet hit Earth--it would cool down and solidify by itself.” Although an MSR could also run on uranium or plutonium, using the less-radioactive element thorium, with a little plutonium or uranium as a catalyst, has both economic and safety advantages. Thorium is four times as abundant as uranium and is easier to mine, in part because of its lower radioactivity. The domestic supply could serve the U.S.’s electricity needs for centuries. Thorium is also exponentially more efficient than uranium. “In a traditional reactor, you’re burning up only a half a percent to maybe 3 percent of the uranium,” Kutsch says. “In a molten-salt reactor, you’re burning 99 percent of the thorium.” The result: One pound of thorium yields as much power as 300 pounds of uranium--or 3.5 million pounds of coal. Because of this efficiency, a thorium MSR would produce far less waste than today’s plants. Uranium-based waste will remain hazardous for tens of thousands of years. With thorium, it’s more like a few hundred. As well, raw thorium is not fissile in and of itself, so it is not easily weaponized. “It can’t be used as a bomb,” Kutsch says. “You could have 1,000 pounds in your basement, and nothing would happen.” Without the need for large cooling towers, MSRs can be much smaller than typical light-water plants, both physically and in power capacity. Today’s average nuclear power plant generates about 1,000 megawatts. A thorium-fueled MSR might generate as little as 50 megawatts. Smaller, more numerous plants could save on transmission loss (which can be up to 30 percent on the present grid). The U.S. Army is interested in using MSRs to power individual bases, Kutsch says, and Google, which relies on steady power to keep its servers running, held a conference on thorium reactors last year. “The company would love to have a 70- or 80-megawatt reactor sitting next door to a data center,” Kutsch says.

#### Yes great power interests in Central Asia.

Arun Sahgal and Vinod Anand, 2010. Senior Fellow at the Institute for Defense Studies and Analyses and ‘Distinguished Fellow’ School of Geo-Politics at the Manipal Academy of Higher Education; and postgraduate in defence and strategic studies and is an alumnus of Defence Services Staff College and College of Defence Management. “Strategic Environment in Central Asia and India,” <http://www.silkroadstudies.org/new/docs/publications/1004Joshi-V-Strategic.pdf>.

The geo-strategic salience of Central Asia today has been underscored by two main factors. First, Central Asia has become important because of the discovery of hydrocarbon reserves and second, it has become a major transportation hub for gas and oil pipelines and multi-modal communication corridors connecting China, Russia, Europe, the Caucasus region, the Trans-Caspian region and the Indian Ocean. Furthermore, whether it was Czarist Russia or the Soviet Union or even the present Central Asian regimes, there has al- ways been a strategic ambition in the north to seek access to the warm waters of the Indian Ocean. Thus Afghanistan, which links Central Asia and South Asia, is a strategic bridge of great geopolitical significance. Central Asia and South Asia are intimately connected not only geographically but also strategically. The Central Asian republics of Turkmenistan, Uzbekistan and Tajikistan have borders with Afghanistan, Iran lies to its west and Pakistan to the east and south. Therefore, the geostrategic significance of Afghanistan is enhanced even though it may not be an oil- or gas-rich country. With the control of Afghanistan comes the control of the land routes between the Indian subcontinent and resource-rich Central Asia, as well as of a potential corridor to Iran and the Middle East. Thus, stability and peace in Afghanistan, and for that matter Pakistan, are a geostrategic imperative. Central Asia has never been a monolithic area and is undergoing a turbulent transitional process with a diverse range of ethnicities and fragmented societies throughout the region. These societal divisions and lack of political maturity compound the social, economic and political challenges. Security and economic issues are the two most important components of the Central Asian states’ engagement with outside powers. Among the states themselves there are elements of both cooperation and competition. Historical legacies, their geo-strategic locations, and above all their perceived national interests profoundly influence the political choices of Central Asian nations. The weaknesses of the new nations in Central Asia pave the way for outside powers to interfere in their internal affairs.

### 1NR—Overview

#### There are only things included. Financial Incentives need to be narrow to improve discussion—otherwise its unlimited.

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

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

#### Broadly defining incentives makes more than 40 mechanisms topical.

Moran 86—non-resident fellow at the Center for Global Development and holds the Marcus Wallenberg Chair at the School of Foreign Service at Georgetown University(Theodore, Investing in Development: New Roles for Private Capital?, p. 29—googlebooks)

Guisinger finds that if “incentives” are broadly defined to include tariffs and trade controls along with tax holidays, subsidized loans, cash grants, and other fiscal measures, they comprise more than forty separate kinds of measures. Moreover, the author emphasizes, the value of an incentive package is just one of several means that governments use to lure foreign investors. Other methods—for example, promotional activities (advertising, representative offices) and subsidized government services—also influence investors’ location decisions. The author points out that empirical research so far has been unable to distinguish the relative importance of fundamental economic factors and of government policies in decisions concerning the location of foreign investment—let alone to determine the effectiveness of individual government instruments.

### 1NR—Webb

#### This interpretation is too broad --- allows anything beyond those categories so long as its use of public funds (anything)

#### Webb says contingently given. That excludes actual purchases.

#### Webb is Canadian. This means his distinctions on incentives don’t apply

MacNevin 93, Alex -Tax Evaluation Division – Federal Department of Finance, 31 Alta. L. Rev. 539

Not surprisingly, Mr. Webb's perspective is primarily legal in focus; he is concerned with what he views as deficiencies in legal structure and channels of legal authority and recourse. As an economist, I am not qualified to discuss the legal issues raised by Mr. Webb. However, his passing reference, in a related paper to be delivered at this conference, refers to the Auditor General's estimates that there are $41 billion and $28 billion in, respectively, direct expenditure incentives and tax expenditure incentives.1 Incentives are thus ultimately about money -- that is, who gets it, why, how, how much, what is the effect and how is this accounted for -- and therefore have important economic as well as legal dimensions. While Mr. Webb's paper deals with both expenditure and tax incentives, my comments concentrate on the latter, with which I am most familiar. II. THE IDENTIFICATION OF TAX INCENTIVES One fundamental problem with respect to accountability in the area of taxation arises because of difficulties in defining what is or is not a tax expenditure or a tax incentive. A central aspect of accountability relates to the seemingly simple basic requirement for documenting the amounts of money foregone through various incentives. Mr. Webb notes that information on the costs of tax incentives are reported only sporadically in tax expenditure accounts, the last of which was put out by the Minister of Finance in 1985. He also points out that tax incentives are removed from the normal budgeting and estimating procedures that apply to many other incentives on the expenditure side (which, incidentally, he views as generally deficient). The infrequent release of tax expenditures (or, as they were called in the 1985 document, selective tax measures) tables may in part reflect the absence of a legal requirement that they be produced on a regular basis.2 They also, however, reflect significant conceptual difficulties encountered in constructing such accounts as well as prevailing concerns about the extent of their usefulness, including their interpretation. Difficulties in this regard were highlighted in a 1988 conference on tax expenditures and accountability in taxation that was jointly sponsored by the Department of Finance and the John Deutsch Institute of Queen's University.3 In the opinion of many of the public finance experts who participated in the conference, tax expenditures often cannot easily be distinguished from structural parameters of the tax system. Identification of tax incentives necessitates comparison of the actual tax system with an ideal "benchmark" tax system. This is entirely different from the case of direct expenditures where no comparable reference base is required. One practical difficulty confronting tax expenditure accounting is that any view about what the tax base should be is essentially a value judgement and hence will vary from individual to individual. The result is that items which may be viewed as tax expenditures under one particular benchmark tax system may not be viewed as such under another benchmark. For example, tax deductions for retirement savings plans are a tax expenditure under an annual income tax benchmark, but are not tax expenditures under lifetime income tax or consumption tax benchmarks. Since the federal tax system contains a mixture of elements of all three of these tax regimes, considerable difficulties in identifying tax expenditures exist. Related additional complexities arise because an actual tax system can only approximate the desirable characteristics of any particular normative view as to what should be taxed. For example, while economists may be able to define fairly precisely what real economic income is over a particular period of time under an income tax base, it is impractical to design an income tax system that has the actual characteristics dictated by theory. The result of is that in some instances, it is not clear how a particular tax measure or group of related tax measures should be viewed under an actual tax system that is inevitably only an imperfect approximation of a chosen "benchmark" tax system.4 Many examples can be given to illustrate the difficulties that arise in this respect. For example, considerable uncertainty arises about how the various provisions relating to the taxation of capital gains should be treated for tax expenditure accounting purposes under an income tax regime that taxes nominal gains on a realization basis rather than real gains on an accrual basis. The integration of the personal and corporate income tax systems gives rise to other examples. Under a view that treats the integrated personal and corporated tax systems as the benchmark, the dividend tax credit is not a tax expenditure. Under one that treats the personal and corporate tax systems as separate benchmark systems, it is. The tax expenditure treatment of cash accounting for farmers and fishermen provides another example. Economists are uncomfortable on tax principle grounds with the deductibility of expenditures on inventory because such expenditures merely reflect the transfer of one asset (cash) into another asset (inventory). Accrual accounting rules, which are required of other types of businesses, effectively result in unsold inventories being added back into income at the end of the year so that no deduction in the year is permitted. Past tax expenditure accounts have identified cash accounting as a tax expenditure, although it is far from obvious that, at least for full-time farmers and fishermen, cash accounting on balance results in lower tax liabilities over time or that from their perspective it is anything more than a peculiar tax wrinkle. It is notable that there is no dollar estimate of the value of cash accounting in previous tax expenditure accounts. III. THE ACCOUNTABILITY OF TAX INCENTIVES One common theme that emerged from the conference on tax expenditures and accountability was that, in light of the many difficulties in identifying tax expenditures, it might be desirable to present tax expenditure information from the perspective of a number of different normative benchmark systems. This would highlight aspects of the tax system from these different perspectives. It would, however, achieve this at the cost of considerable added complexity in interpreting the accounts, particularly to users of the accounts who were not tax experts. There may, therefore, be somewhat of a conflict between the usefulness of tax expenditure accounts in their role as an instrument of tax analysis versus their role as an accountability instrument where clarity and simplicity of presentation and interpretation have high priority. It may be possible to strike a compromise by, for example, ensuring that tax expenditure accounts clearly identify the key tax measures that most reasonably could be substituted for direct expenditure programs. This would facilitate comparisons of tax expenditures data with those for comparable programs on the direct expenditure side in the Public Accounts and thereby permit a more complete assessment of the incentives and subsidies applying to particular sectors, geographical regions, and so on. Such an approach would foster the accountability objective of "functional equivalence" identified by Mr. Webb. Problems with compiling tax expenditures accounts are highlighted when the very structure of the tax system undergoes major changes, such as with the income tax reform of 1988 and with the introduction of the GST to replace the manufacturers sales tax. In such circumstances, presentation of tax expenditure information must be thoroughly reformulated to reflect the revised tax regimes and, indeed, the changing benchmark norms. This can give rise to problems of lack of continuity and comparability of data over time. As an additional practical matter, significant lags in the availability of taxation data may delay the release of tax expenditure tables that reflect the new regimes. There are two and three year lags for, respectively, personal income tax data and corporate income tax data. Delays in the availability of taxation data are particularly problematic since it is typically much more difficult to forecast the ultimate cost of tax incentives than is the case for direct expenditure incentives. The main reason for this is that tax incentives are almost always open-ended while direct expenditure incentives are typically subject to an overall budget constraint. The total cost of a tax incentive thus depends entirely on the usually difficult to predict take-up response of taxpayers, which can give rise to considerable uncertainty in budgeting.5 There are thus significant difficulties with tax expenditure analysis even as an accounting device for providing estimates of the cost of individual tax measures. Judged by the other criteria identified above they are substantially more deficient since they provide no insight whatsoever into the questions of who benefits from tax incentives, why, and what are their effects. Analytical techniques, (such as full evaluations) in addition to accounting techniques, are required in order to provide a complete picture of both the cost and the efficacy of tax measures. I would note, however, that the problems in identifying tax expenditures, particularly in an environment of changing tax structures or norms, make it difficult to systematically evaluate tax expenditures or incentives on a routine cyclical basis as is done for direct expenditure programs. The limitations of tax expenditures information naturally raise questions about the appropriate amount of scarce analytical resources that should be devoted to the preparation of tax expenditure tables, rather than to alternative or complementary tools of accountability such as in-depth studies of the rationale and cost-effectiveness of particular tax measures and related groupings of tax measures; irrespective of whether there is a consensus as to their tax expenditure status under any particular benchmark tax system. The Department of Finance has long wrestled with the practical difficulties and trade-offs involved in compiling tax expenditure data and other accountability information that is, on balance, most revealing with respect to the underlying structure of the tax system. The proceedings of the John Deutsch Conference indicate clearly that there are no easy solutions to the problems. IV. CONCLUSION As noted earlier, Mr. Webb also makes reference to the adequacy of current budgeting procedures for tax incentives. The problem of identifying and measuring tax incentives separately from the "normal" parameters of the tax system hints at the intimate relationship between tax expenditures or (tax incentives) policy and the more limited process of modifying and improving the tax system -- that is the strict design of tax policy. This latter process is a natural component of the government's routine budget procedures and is subject to well-known budget conventions. Procedures relating to the introduction or modification of tax incentives must therefore inevitably be conducted within that somewhat restrictive environment. Can improvements be made which reflect both the need for improved budgeting procedures for tax incentives and the unique environment in which tax measures are designed and modified? I am sure they can but I am considerably less sure that such procedures can be routinized through legislative structure or guidelines. In summary, I fully support the general thrust of Mr. Webb's paper of the need for improved structures and instruments of accountability. In my view, however, the pursuit of that objective must be tempered by recognition of the significant practical obstacles that arise because of the unique characteristics of tax incentives.

### 1NR—Waxman

#### Waxman def is based on DOE order 5700.5

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

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

#### That’s no longer statute

DOE 2k [5/8/00 “DOE N 251.35, Cancellation of Directives,” [https://www.directives.**doe**.gov/directives/0251.035-CNotice](https://www.directives.doe.gov/directives/0251.035-CNotice)]

Effective immediately the following directives are canceled:

• DOE Order 5484.1, ENVIRONMENTAL PROTECTION, SAFETY AND HEALTH PROTECTION INFORMATION REPORTING REQUIREMENTS, dated 2-24-81;

• DOE Order 1332.2, UNIFORM REPORTING SYSTEM FOR FEDERAL ASSISTANCE, dated 10-31-83;

• DOE Order 5700.5A, POLICY AND MANAGEMENT PROCEDURES FOR FINANCIAL INCENTIVE PROGRAMS, dated 6-8-92; and

• HQ 1325.1, ACTION COORDINATION AND TRACKING SYSTEM, dated 7-30-79.

## \*\*\* 2NR

### AT: Thorium Inevitable—China/India

#### India and China are still primarily focused on uranium reactors—significantly more government backing is needed to push the technology through.

Marin Katusa, 2/14/2012. Chief Energy Investment Strategist @ Casey Research. “Why not thorium?” Mining.com, http://www.mining.com/why-not-thorium/.

Researchers have studied thorium-based fuel cycles for 50 years, but India leads the pack when it comes to commercialization. As home to a quarter of the world's known thorium reserves and notably lacking in uranium resources, it's no surprise that India envisions meeting 30% of its electricity demand through thorium-based reactors by 2050. In 2002, India's nuclear regulatory agency issued approval to start construction of a 500-megawatts electric prototype fast breeder reactor, which should be completed this year. In the next decade, construction will begin on six more of these fast breeder reactors, which "breed" U233 and plutonium from thorium and uranium. Design work is also largely complete for India's first Advanced Heavy Water Reactor (AHWR), which will involve a reactor fueled primarily by thorium that has gone through a series of tests in full-scale replica. The biggest holdup at present is finding a suitable location for the plant, which will generate 300 MW of electricity. Indian officials say they are aiming to have the plant operational by the end of the decade. China is the other nation with a firm commitment to develop thorium power. In early 2011, China's Academy of Sciences launched a major research and development program on Liquid Fluoride Thorium Reactor (LFTR) technology, which utilizes U233 that has been bred in a liquid thorium salt blanket. This molten salt blanket becomes less dense as temperatures rise, slowing the reaction down in a sort of built-in safety catch. This kind of thorium reactor gets the most attention in the thorium world; China's research program is in a race with similar though smaller programs in Japan, Russia, France, and the US. There are at least seven types of reactors that can use thorium as a nuclear fuel, five of which have entered into operation at some point. Several were abandoned not for technical reasons but because of a lack of interest or research funding (blame the Cold War again). So proven designs for thorium-based reactors exist and need but for some support. Well, **maybe quite a bit of support**. One of the biggest challenges in developing a thorium reactor is finding a way to fabricate the fuel economically. Making thorium dioxide is expensive, in part because its melting point is the highest of all oxides, at 3,300° C. The options for generating the barrage of neutrons needed to kick-start the reaction regularly come down to uranium or plutonium, bringing at least part of the problem full circle. And while India is certainly working on thorium, not all of its eggs are in that basket. India has 20 uranium-based nuclear reactors producing 4,385 MW of electricity already in operation and has another six under construction, 17 planned, and 40 proposed. The country gets props for its interest in thorium as a homegrown energy solution, but **the majority of its nuclear money is still going toward traditional uranium**. China is in exactly the same situation – while it promotes its efforts in the LFTR race, **its big bucks are behind uranium reactors**. China has only 15 reactors in operation but has 26 under construction, 51 planned, and 120 proposed.

### AT: LWRs Have Long Construction Time

#### Westinghouse will come online quick—built on mostly proven designs means they’ll have experience to do it quickly.

Brian Wheeler, 4/1/2012. Editor for Power Engineering. “Developing Small Modular Reactor Designs in the U.S,” Power Engineering, http://www.power-eng.com/articles/npi/print/volume-5/issue-2/nucleus/developing-small-modular-reactor-designs-in-the-us.html.

As the only vendor with licensed and tested passive safety systems and with hundreds of millions of dollars already invested into research and development for the AP1000, Goossen said Westinghouse will take a lot of the lessons learned from the development of the AP1000 and place that knowledge into the SMR. The Westinghouse SMR, though, is a stand-alone unit. The reactor is modular in the sense that it will be manufactured in a factory setting, shipped to the plant site and installed on-site **over an 18-24 month timeframe**. Goossen pointed out that Westinghouse, as part of its development process, is drawing from as much experience, proven technology and testing as possible to achieve safety and economics. "We're balancing innovation and wisdom," said Goossen. "We are trying to keep the untested or unproven innovations down so we can get through licensing **as fast as possible**, keep costs down and **get to market first**."