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#### Plan: The United States Federal Government should substantially increase commercial loan guarantees to develop and deploy Power Reactor Innovative Small Module reactors for the purpose of energy production in the United States.

### ADVANTAGE 1

Is Russian Security

#### Dealing with waste is inevitable in the squo

George Monbiot, 12-5-2011, is a writer, known for his environmental and political activism, writes a weekly column for The Guardian, and is the author of a number of books, The Guardian, “A Waste of Waste,” <http://www.monbiot.com/2011/12/05/a-waste-of-waste/>

The temptation, when a great mistake has been made, is to seek ever more desperate excuses to sustain the mistake, rather than admit the terrible consequences of what you have done. But now, in the UK at least, we have an opportunity to make amends. Our movement can abandon this drivel with a clear conscience, for the technology I am about to describe ticks all the green boxes: reduce, reuse, recycle. Let me begin with the context. Like other countries suffering from the idiotic short-termism of the early nuclear power industry, the UK faces a massive bill for the storage and disposal of radioactive waste. The same goes for the waste produced by nuclear weapons manufacturing. But is this really waste, or could we see it another way? In his book Prescription for the Planet, the environmentalist Tom Blees explains the remarkable potential of integral fast reactors (IFRs) (11). These are nuclear power stations which can run on what old nuclear plants have left behind. Conventional nuclear power uses just 0.6% of the energy contained in the uranium that fuels it. Integral fast reactors can use almost all the rest. There is already enough nuclear waste on earth to meet the world’s energy needs for several hundred years, with scarcely any carbon emissions. IFRs need be loaded with fissile material just once. From then on they can keep recycling it, extracting ever more of its energy, until a small fraction of the waste remains. Its components have half-lives of tens rather than millions of years. This makes them more dangerous, but much easier to manage in the long term. When the hot waste has been used up, the IFRs can be loaded with depleted uranium (U-238), of which the world has a massive stockpile (12).The material being reprocessed never leaves the site: it remains within a sealed and remotely-operated recycling plant. Anyone trying to remove it would quickly die. By ensuring the fissile products are unusable, the IFR process reduces the risk of weapons proliferation. The plant operates at scarcely more than atmospheric pressure, so it can’t blow its top. Better still, it could melt down only by breaking the laws of physics. If the fuel pins begin to overheat, their expansion stops the fission reaction. If, like the Fukushima plant, an IFR loses its power supply, it simply shuts down, without human agency. Running on waste, with fewer pumps and valves than conventional plants, they are also likely to be a good deal cheaper (13).So there’s just one remaining question: where are they? In 1994 the Democrats in the US Congress, led by John Kerry, making assertions as misleading as the Swift Boat campaign that was later deployed against him(14), shut down the research programme at Argonne National Laboratories that had been running successfully for 30 years. Even Hazel O’Leary, the former fossil fuel lobbyist charged by the Clinton administration with killing it, admitted that “no further testing” is required to prove its feasibility (15).But there’s a better demonstration that it’s good to go: last week GE Hitachi (GEH) told the British government that it could build a fast reactor within five years to use up the waste plutonium at Sellafield, and if it doesn’t work, the UK won’t have to pay (16). A fast reactor has been running in Russia for 30 years (17) and similar plants are now being built in China and India (18, 19). GEH’s proposed PRISM reactor uses the same generating technology as the IFR, though the current proposal doesn’t include the full reprocessing plant. It should. If the government does not accept GEH’s offer, it will, as the energy department revealed on Thursday, handle the waste through mixed oxide processing (mox) instead (20). This will produce a fuel hardly anyone wants, while generating more waste plutonium than we possess already. It will raise the total energy the industry harvests from 0.6% to 0.8% (21). So we environmentalists have a choice. We can’t wish the waste away. Either it is stored and then buried. Or it is turned into mox fuels. Or it is used to power IFRs. The decision is being made at the moment, and we should determine where we stand. I suggest we take the radical step of using science, not superstition, as our guide.

#### GNEP/IFNEC is faltering – key to securing fissile material

Tim Gitzel, July 2012, senior vice-president and chief operating officer and was appointed president, President and CEO of Cameco, extensive experience in Canadian and international uranium mining activities, executive vice-president, mining business unit for AREVA, College of Law at the University of Saskatchewan, serves as vice-chair on both the Mining Association of Canada and the Canadian Nuclear Association boards of directors, past president of the Saskatchewan Mining Association, and has served on the boards of Sask Energy, co-chair of the Royal Care campaign, a recipient of the Centennial Medal, World Nuclear Association (WNA), “International Framework for Nuclear Energy Cooperation (formerly Global Nuclear Energy Partnership),” <http://www.world-nuclear.org/info/inf117_international_framework_nuclear_energy_cooperation.html>

The International Framework for Nuclear Energy Cooperation (IFNEC), formerly the Global Nuclear Energy Partnership (GNEP), aims to accelerate the development and deployment of advanced nuclear fuel cycle technologies while providing greater disincentives to the proliferation of nuclear weapons. GNEP was initiated by the USA early in 2006, but picked up on concerns and proposals from the International Atomic Energy Agency (IAEA) and Russia. The vision was for a global network of nuclear fuel cycle facilities all under IAEA control or at least supervision. Domestically in the USA, the Global Nuclear Energy Partnership (GNEP) was based on the Advanced Fuel Cycle Initiative (AFCI), and while GNEP faltered with the advent of the Barack Obama administration in Washington from 2008, the AFCI is being funded at higher levels than before for R&D "on proliferation-resistant fuel cycles and waste reduction strategies." Two significant new elements in the strategy are new reprocessing technologies which separate all transuranic elements together (and not plutonium on its own), and advanced burner (fast) reactors to consume the result of this while generating power. GNEP was set up as both a research and technology development initiative and an international policy initiative. It addresses the questions of how to use sensitive technologies responsibly in a way that protects global security, and also how to manage and recycle wastes more effectively and securely. The USA had a policy in place since 1977 which ruled out reprocessing used fuel, on non-proliferation grounds. Under GNEP, reprocessing is to be a means of avoiding proliferation, as well as addressing problems concerning high-level wastes. Accordingly, the US Department of Energy set out to develop advanced fuel cycle technologies on a commercial scale. As more countries consider nuclear power, it is important that they develop the infrastructure capabilities necessary for such an undertaking. As with GNEP, IFNEC partners are working with the IAEA to provide guidance for assessing countries' infrastructure needs and for helping to meet those needs. For countries that have no existing nuclear power infrastructure, IFNEC partners can share knowledge and experience to enable developing countries to make informed policy decisions on whether, when, and how to pursue nuclear power without any need to establish sensitive fuel cycle facilities themselves. With the USA taking a lower profile in GNEP from 2009, the partners are focused on collaboration to make nuclear energy more widely accessible in accordance with safety, security and non-proliferation objectives, as an effective measure to counter global warming, and to improve global energy security. A change of name to International Framework for Nuclear Energy Cooperation was adopted in June 2010, along with a new draft vision statement, which read: "The Framework provides a forum for cooperation among participating states to explore mutually beneficial approaches to ensure the use of nuclear energy for peaceful purposes proceeds in a manner that is efficient, safe, secure, and supports non-proliferation and safeguards." By some accounts, this envisages "cradle to grave" fuel management as central, along with assurance of fuel supply. IFNEC agenda Broadly, IFNEC's mission is the global expansion of nuclear power in a safe and secure manner. A major rationale is reducing the threat of proliferation of nuclear materials and the spread of sensitive nuclear technology for non-peaceful purposes. With greater use of nuclear energy worldwide the possibility of the spread of nuclear material and technology for the development of weapons of mass destruction must be countered to avoid increasing the present threat to global security. A second issue addressed by IFNEC is the efficiency of the current nuclear fuel cycle. The USA, the largest producer of nuclear power, has employed a 'once through' fuel cycle. This practice only uses a part of the potential energy in the fuel, while effectively wasting substantial amounts of useable energy that could be tapped through recycling. The remaining fissionable material can be used to create additional power, rather than treating it as waste requiring long-term storage. Others, notably Europe and Japan, recover the residual uranium and plutonium from the used fuel to recycle at least the plutonium in light water reactors. However, no-one has yet employed a comprehensive technology that includes full actinidea recycle. In the USA, this question is pressing since significant amounts of used nuclear fuel are stored in different locations around the country awaiting shipment to a planned geological repository which was to be at Yucca Mountain in Nevada. This project is delayed, and in any case will fill very rapidly if it is used simply for used fuel rather than the separated wastes after reprocessing it. IFNEC also aims to address cost issues associated with the development and expansion of nuclear power in developing countries. Nuclear programs require a high degree of technical and industrial expertise. This is a serious obstacle for emerging countries attempting to develop nuclear power, although efforts are underway to increase the number of indigenously-trained nuclear experts through a variety of education and training initiatives. Internationally, the countries identified by the US Department of Energy (DOE) as likely participants at both enrichment and recycling ends are the USA, UK, France, Russia and Japan. The USA and Japan agreed to develop a nuclear energy cooperation plan centered on GNEP and the construction of new nuclear power plants. (Japan also intended to participate in the DOE's FutureGen clean coal project, which was abandoned but may possibly be revived.) Several bilateral agreements centered on GNEP/IFNEC have been developed. IFNEC parties and rationale At the first ministerial meeting in May 2007, the USA, China, France, Japan and Russia became formally the founding members of GNEP. Four of the five are nuclear weapons states and have developed full fuel cycle facilities arising from that; the non-nuclear weapons state, Japan, has developed similar facilities to support its extensive nuclear power program. To date, 31 nationsb are participants in IFNEC. Most of these signed the GNEP Statement of Principles1, which established broad guidelines for participation and incorporates seven objectives that touch on each element of GNEP. Under GNEP, so-called 'fuel cycle nations' would provide assured supplies of enriched nuclear fuel to client nations, which would generate electricity before returning the used fuel. The used fuel would then undergo advanced reprocessing so that the uranium and plutonium it contained, plus long-lived minor actinides, could be recycled in advanced nuclear power reactors. Waste volumes and radiological longevity would be greatly reduced by this process, and the wastes would end up either in the fuel cycle or user countries. Nuclear materials would never be outside the strictest controls, overseen by the IAEA. Two sensitive processes in particular would not need to be employed in most countries: enrichment and reprocessing. The limitation on these, by commercial dissuasion rather than outright prohibition, is at the heart of GNEP strategy. A corollary of this dissuasion is that GNEP/IFNEC member nations would be assured of reliable and economic fuel supply under some IAEA arrangement yet to be specified. GNEP/IFNEC work plan The GNEP members set up two principal working groups: The reliable nuclear fuel services working group (RNFS WG) is addressing nuclear fuel leasing and other considerations around comprehensive nuclear fuel supply goals, and includes evaluation of back-end fuel cycle options. The nuclear infrastructure development working group (ID WG) is addressing human resource development, radioactive waste management, small modular reactors, financing options, engagement with specialist organizations and identifying infrastructure requirements for an international nuclear fuel services framework enabling nuclear power deployment in many countries. An early priority was seen to be the development of new reprocessing technologies to enable recycling of most of the used fuel. One of the concerns when reprocessing used nuclear fuel is ensuring that separated fissile material is not used to create a weapon. One chemical reprocessing technology – PUREX – has been employed for over half a century, having been developed in wartime for military use (see page on Processing of Used Nuclear Fuel). This has resulted in the accumulation of 240 tonnes of separated reactor-grade plutonium around the world (though some has been used in the fabrication of mixed oxide fuel). While this is not suitable for weapons use, it is still regarded as a proliferation concern. New reprocessing technologies are designed to combine the plutonium with some uranium and possibly with minor actinides (neptunium, americium and curium), rendering it impractical to use the plutonium in the manufacture of weapons. GNEP/IFNEC creates a framework where states that currently employ reprocessing technologies can collaborate to design and deploy advanced separations and fuel fabrication techniques that do not result in the accumulation of separated pure plutonium. Several developments of PUREX which fit the GNEP/IFNEC concept are being trialled: NUEX separates uranium and then all transuranics (including plutonium) together, with fission products separately (USA). UREX+ separates uranium and then either all transuranics together or simply neptunium with the plutonium, with fission products separately (USA). COEX separates uranium and plutonium (and possibly neptunium) together as well as a pure uranium stream, leaving other minor actinides with the fission products. A variation of this separates americium and curium from the fission products (France). GANEX separates uranium and plutonium as in COEX, then separates the minor actinides plus some lanthanides from the short-lived fission products (France). The central feature of all these variants is to keep the plutonium either with some uranium or with other transuranics which can be destroyed by burning in a fast neutron reactor – the plutonium being the main fuel constituent. Trials of some fuels arising from UREX+ reprocessing in USA are being undertaken in the French Phenix fast reactor. An associated need is to develop the required fuel fabrication plant. That for plutonium with only some uranium and neptunium is relatively straightforward and similar to today's MOX fuel fabrication plants. A plant for fuel including americium and curium would be more complex (due to americium being volatile and curium a neutron emitter). The second main technological development originally envisaged under GNEP is the advanced recycling reactor – basically a fast reactor capable of burning minor actinides. Thus used fuel from light water reactors would be transported to a recycling centre, where it would be reprocessed and the transuranic product (including plutonium) transferred to a fast reactor on site. This reactor, which would destroy the actinides, would have a power capacity of perhaps 1000 MWe. The areas of development for fast reactor technology centre on the need for fast reactors to be cost competitive with current light water reactors. Countries such as France, Russia and Japan have experience in the design and operation of fast reactors and the USA is working with them to accelerate the development of advanced fast reactors that are cost competitive, incorporate advanced safeguards features, and are efficient and reliable. The advent of such fast reactors would mean that reprocessing technology could and should step from the aqueous processes derived from PUREX described above to electrometallurgical processes in a molten salt bath. Separating the actinides then is by electrodeposition on a cathode, without chemical separation of heavy elements as occurs in the Purex and related processes. This cathode product can then be used in a fast reactor, since it is not sensitive to small amounts of impurities. GE Hitachi Nuclear Energy (GEH) is developing this 'Advanced Recycling Center' concept which combines electrometallurgical separation and burning the final product in one or more of its PRISM fast reactors on the same site.2 The separation process would remove uranium, which is recycled to light water reactors; then fission products, which are waste; and finally the actinides including plutonium. With respect to the ultimate disposition of nuclear waste from recycling, three options exist conceptually: User responsibility. The radioactive wastes from the nuclear fuel recycling centre could be considered as processed waste belonging to the user nation that sent its used nuclear fuel to the recycling centre. These wastes might then be shipped back to that user nation for final disposal. Supplier responsibility. The nation hosting the recycling centre might retain the waste or, if a different supplier nation had manufactured the original fuel, all wastes arising from the original fuel could be considered the responsibility of that fuel supplier nation. Third-party responsibility. A disposal facility might be sited in a country that is, in particular cases, neither the supplier nor the user, but is using its technological capability and geological suitability to manage the safe delivery of a commercially and environmentally valuable service. The IFNEC program is considering the ownership and final disposal of waste, but this discussion has not yet reached beyond the preliminary stages. The second and third conceptual options for waste disposal would require one or more international radioactive waste final disposal facilities (see page on International Nuclear Waste Disposal Concepts), and serious discussion of those options will begin only when nations enter into real consideration of the sensitive issue of the hosting of such facilities. In 2012 the RNFS WG is working on a paper entitled ‘Comprehensive Fuel Services: Strategies for the Back End of the Fuel Cycle’ to pursue agreement on the basis for international cooperation on repositories and reprocessing for these activities to be commercialised. Finally, IFNEC is concerned to foster the development of 'grid-appropriate reactors', i.e. smaller units (perhaps 50-350 MWe) for electricity grids of up to 3 GWe. These should incorporate advanced features including safety, simplicity of operation, long-life fuel loads, intrinsic proliferation-resistance and security3. In January 2007, the US Department of Energy (DOE) announced a new strategic plan for GNEP initiatives, including preparation of an environmental impact statement. It would assess three facilities: a fuel recycling centre including reprocessing and fuel fabrication plants; a fast reactor to burn the actinide-based fuel and transmute transuranic elements; and an advanced fuel cycle research facility. The DOE envisaged the first two being industry-led initiatives. In October 2007, the DOE awarded $16 million to four industry consortia for GNEP-related studies. The largest share of this, $5.6 million, went to the International Nuclear Recycling Alliance (INRA) led by Areva and including Mitsubishi Heavy Industries (MHI), Japan Nuclear Fuel Ltd (JNFL), Battelle, BWX Technologies and Washington Group International. INRA was contracted to provide three major studies: technology development roadmaps analyzing the technology needed to achieve GNEP goals; business plans for the development and commercialization of the advanced GNEP technologies and facilities; and conceptual design studies for the fuel recycling centre and advanced recycling reactor. Areva and JNFL are focused on the Consolidated Fuel Treatment Center, a reprocessing plant (which will not separate pure plutonium), and MHI on the Advanced Recycling Reactor, a fast reactor which will burn actinides with uranium and plutonium. These are the two main technological innovations involved with GNEP. In this connection MHI has also set up Mitsubishi FBR Systems (MFBR). INRA appears to have materialized out of a September 2007 agreement between Areva and JNFL to collaborate on reprocessing. Its contract with the DOE was extended in April 2008. A significant setback for the US leadership of GNEP was related to funding by Congress. For FY 2007 the program – including some specifically US aspects – had $167 million, and for FY 2008 Congress cut it back to $120 million, severely constraining the fuel cycle developments. For FY 2009, GNEP did not receive any funding although $120 million was allocated to the Advanced Fuel Cycle Initiative (AFCI), which funds research into reprocessing technologies. The funding for AFCI was only about 40% of the amount requested by the administration. Thus in the USA, GNEP has been largely reduced to an R&D program on advanced fuel cycle technologies. In June 2009, the DOE cancelled the programmatic environmental impact statement for GNEP "because it is no longer pursuing domestic commercial reprocessing, which was the primary focus of the prior Administration's domestic GNEP program."4 Outcomes of IFNEC Under any scenario, the USA and others will require waste repositories; however, recycling used fuel will greatly reduce the amount of waste destined for disposal. For the planned US repository at Yucca Mountain in Nevada, the reprocessing-recycling approach with burning of actinides and perhaps also some long-lived fission products would mean that the effective capacity of such a repository would be increased by a factor of 50 or more. This is due to decreased radiotoxicity and heat loads, as well as reducing greatly the ultimate volume of waste requiring disposal. IFNEC envisages the development of comprehensive fuel services, including such options as fuel leasing, to begin addressing the challenges of reliable fuel supply while maximizing non-proliferation benefits. The establishment of comprehensive and reliable fuel services, including used fuel disposition options, will create a more practical approach to nuclear power for nations seeking its benefits without the need to establish indigenous fuel cycle facilities. It is through enabling such a comprehensive framework that IFNEC will possibly make its primary contribution to reducing proliferation risk.

#### The plan would cause quick U.S.-Russia PRISM commercialization and fissile material oversight.

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While the scientists and engineers were perfecting the many revolutionary features of the IFR at the EBR-II site in the Eighties and early Nineties, a consortium of major American firms collaborated with them to design a commercial-scale fast reactor based on that research. General Electric led that group, which included companies like Bechtel, Raytheon and Westinghouse, among others. The result was a modular reactor design intended for mass production in factories, called the PRISM (Power Reactor Innovative Small Module). A later iteration, the S-PRISM, would be slightly larger at about 300 MWe, while still retaining the features of the somewhat smaller PRISM. For purposes of simplicity I will refer hereinafter to the S-PRISM as simply the PRISM. After the closure of the IFR project, GE continued to refine the PRISM design and is in a position to pursue the building of these advanced reactors as soon as the necessary political will can be found. Unfortunately for those who would like to see America’s fast reactor be built in America, nuclear politics in the USA is nearly as dysfunctional as it is in Germany. The incident at Fukushima has only made matters worse. The suggestion in this report that fast reactors are thirty years away is far from accurate. GE-Hitachi plans to submit the PRISM design to the Nuclear Regulatory Commission (NRC) next year for certification. But that time-consuming process, while certainly not taking thirty years, may well be in process even as the first PRISM is built in another country. This is far from unprecedented. In the early Nineties, GE submitted its Advanced Boiling Water Reactor (ABWR) design to the NRC for certification. GE then approached Toshiba and Hitachi and arranged for each of those companies to build one in Japan. Those two companies proceeded to get the design approved by their own NRC counterpart, built the first two ABWRs in just 36 and 39 months, fueled and tested them, then operated them for a year before the NRC in the US finally certified the design. International partners On March 24th an event was held at the Russian embassy in Washington, D.C., attended by a small number of members of the nuclear industry and its regulatory agencies, both foreign and domestic, as well as representatives of NGOs concerned with nuclear issues. Sergei Kirienko, the director-general of Rosatom, Russia’s nuclear power agency, was joined by Dan Poneman, the deputy secretary of the U.S. Dept. of Energy. This was shortly after the Fukushima earthquake and tsunami, at a time when the nuclear power reactors at Fukushima Daiichi were still in a very uncertain condition. Mr. Kirienko and Mr. Poneman first spoke about the ways in which the USA and Russia have been cooperating in tightening control over fissile material around the world. Then Mr. Kirienko addressed what was on the minds of all of us: the situation in Japan and what that portends for nuclear power deployment in the USA and around the world. He rightly pointed out that the Chernobyl accident almost exactly 25 years ago, and the Fukushima problems now, clearly demonstrate that nuclear power transcends national boundaries, for any major accident can quickly become an international problem. For this reason Kirienko proposed that an international body be organized that would oversee nuclear power development around the world, not just in terms of monitoring fissile material for purposes of preventing proliferation (much as the IAEA does today), but to bring international expertise and oversight to bear on the construction and operation of nuclear power plants as these systems begin to be built in ever more countries. Kirienko also pointed out that the power plants at risk in Japan were old reactor designs. He said that this accident demonstrates the need to move nuclear power into the modern age. For this reason, he said, Russia is committed to the rapid development and deployment of metal-fueled fast neutron reactor systems. His ensuing remarks specifically reiterated not only a fast reactor program (where he might have been expected to speak about Gen III or III+ light water reactor systems), but the development of metal fuel for these systems. This is precisely the technology that was developed at Argonne National Laboratory with the Integral Fast Reactor (IFR) program, but then prematurely terminated in 1994 in its final stages. For the past two years I’ve been working with Dr. Evgeny Velikhov (director of Russia’s Kurchatov Institute and probably Russia’s leading scientist/political advisor) to develop a partnership between the USA and Russia to build metal-fueled fast reactors; or to be more precise, to facilitate a cooperative effort between GE-Hitachi and Rosatom to build the first PRISM reactor in Russia as soon as possible. During those two years there have been several meetings in Washington to put the pieces in place for such a bilateral agreement. The Obama administration, at several levels, seems to be willingly participating in and even encouraging this effort. Dr Evgeny Velikhov, SCGI member Dr. Velikhov and I (and other members of the Science Council for Global Initiatives) have also been discussing the idea of including nuclear engineers from other countries in this project, countries which have expressed a desire to obtain or develop this technology, some of which have active R&D programs underway (India, South Korea, China). Japan was very interested in this technology during the years of the IFR project, and although their fast reactor development is currently focused on their oxide-fueled Monju reactor there is little doubt that they would jump at the chance to participate in this project. Dr. Velikhov has long been an advocate of international cooperation in advanced nuclear power research, having launched the ITER project about a quarter-century ago. He fully comprehends the impact that international standardization and deployment of IFR-type reactors would have on the well-being of humanity at large. Yet if Russia and the USA were to embark upon a project to build the first PRISM reactor(s) in Russia, one might presume that the Russians would prefer to make it a bilateral project that would put them at the cutting edge of this technology and open up golden opportunities to develop an industry to export it. It was thus somewhat surprising when Mr. Kirienko, in response to a question from one of the attendees, said that Russia would be open to inviting Japan, South Korea and India to participate in the project. One might well question whether his failure to include China in this statement was merely an oversight or whether that nation’s notorious reputation for economic competition often based on reverse-engineering new technologies was the reason. I took the opportunity, in the short Q&A session, to point out to Mr. Poneman that the Science Council for Global Initiatives includes not just Dr. Velikhov but most of the main players in the development of the IFR, and that our organization would be happy to act as a coordinating body to assure that our Russian friends will have the benefit of our most experienced scientists in the pursuit of this project. Mr. Poneman expressed his gratitude for this information and assured the audience that the USA would certainly want to make sure that our Russian colleagues had access to our best and brightest specialists in this field. Enter the United Kingdom Sergei Kirienko was very clear in his emphasis on rapid construction and deployment of fast reactors. If the United States moves ahead with supporting a GE-Rosatom partnership, the first PRISM reactor could well be built within the space of the next five years. The estimated cost of the project will be in the range of three to four billion dollars (USD), since it will be the first of its kind. The more international partners share in this project, the less will be the cost for each, of course. And future copies of the PRISM have been estimated by GE-Hitachi to cost in the range of $1,700/kW. Work is under way on gram samples of civil plutonium According to this consultation document, the UK is looking at spending £5-6 billion or more in dealing with its plutonium. Yet if the plutonium were to simply be secured as it currently is for a short time longer and the UK involved itself in the USA/Russia project, the cost would be a small fraction of that amount, and when the project is completed the UK will have the technology in hand to begin mass-production of PRISM reactors. The plutonium stocks of the UK could be converted into metal fuel using the pyroprocessing techniques developed by the IFR project (and which, as noted above, are ready to be utilized by South Korea). The Science Council for Global Initiatives is currently working on arranging for the building of the first commercial-scale facility in the USA for conversion of spent LWR fuel into metal fuel for fast reactors. By the time the first PRISM is finished in Russia, that project will also likely be complete. What this would mean for the UK would be that its stores of plutonium would become the fast reactor fuel envisioned by earlier policymakers. After a couple years in the reactor the spent fuel would be ready for recycling via pyroprocessing, then either stored for future use or used to start up even more PRISM reactors. In this way not only would the plutonium be used up but the UK would painlessly transition to fast reactors, obviating any need for future mining or enrichment of uranium for centuries, since once the plutonium is used up the current inventories of depleted uranium could be used as fuel. Conclusion Far from being decades away, a fully-developed fast reactor design is ready to be built. While I’m quite certain that GE-Hitachi would be happy to sell a PRISM to the UK, the cost and risk could be reduced to an absolute minimum by the happy expedient of joining in the international project with the USA, Russia, and whichever other nations are ultimately involved. The Science Council for Global Initiatives will continue to play a role in this project and would be happy to engage the UK government in initial discussions to further explore this possibility. There is little doubt that Russia will move forward with fast reactor construction and deployment in the very near future, even if the PRISM project runs into an unforeseen roadblock. It would be in the best interests of all of us to cooperate in this effort. Not only will the deployment of a standardized modular fast reactor design facilitate the disposition of plutonium that is currently the driving force for the UK, but it would enable every nation on the planet to avail itself of virtually unlimited clean energy. Such an international cooperative effort would also provide the rationale for the sort of multinational nuclear power oversight agency envisioned by Mr. Kirienko and others who are concerned not only about providing abundant energy but also in maintaining control over fissile materials.

#### Russian nuclear security is a joke spent nuclear fuel is highly vulnerable to terrorist theft – cited means and motivation.

Stephen Menesick, Summer 2011, Political Science and Peace, War and Defense, public policy analysis, Unviersity of Chapel Hill, Global Security Studies, Vol. 2 Issue 3, “ Preventing the Unthinkable: An Overview of Threats, Risks, and US Policy Response to Nuclear Terrorism,” p. 5-6, <http://globalsecuritystudies.com/Menesick%20Nuclear%20Final.pdf>

The outlook in Russia is bleaker. After the Cold War, many Russian nuclear weapons were extremely vulnerable—left nearly unsecured across the country. Since then, the Russian government has made a considerable effort to strengthen security and upgrade technology that guards nuclear weapons and material (Bunn, 2006). However, significant risks still remain. Because of the sheer quantity of weapons in Russia, and the difficulty of managing such a large number of weapons, external risks of outright theft are always a concern. Reports by Russian officials have confirmed that terrorists have conducted intelligence gathering operations on Russian stockpiles, and to date, it is the only country where documentation of terrorist surveillance exists (Bunn 2010, 35). Equipping all sites with state of the art security measures has been a difficult challenge. The Russian government, and consequently the security contractors who are responsible for the upkeep of these facilities, suffers from a lack of financial resources (Joyner & Parkhouse 2009, 215). Additionally, significant internal threats are present. Because the government employs independent security companies to coordinate much of management of nuclear materials, there are two channels for insiders to aid terrorist groups—high level government officials and low level technical personnel. Both groups have incentive to divulge information at the right price, and Russia has a political environment that has been rife with corruption for decades (Bunn 2010, 32-33 and Joyner & Parkhouse 2009, 216). Finally, there is the security risk of Highly Enriched Uranium-fueled reactors (HEU’s). Because of its chemical composition and refinement, HEU can be used easily to make crude nuclear weapons even by non-experts (Norwegian Project Secretariat). Because of the ease with which a weapon can be made out of HEU, it is easy to see why terrorist acquisition is a direct security risk. As of 2009, about half of the 200 remaining reactors were still using HEU fuel, and do not have capability to be converted to lower enriched uranium (LEU) (World Nuclear Association 2011). Most of these are in Russia, where the government has invested little in research to convert their own reactors to LEU power or other alternatives (World Nuclear Association 2011). Further, and most alarming, is that the security at many of these HEU sites is inadequate to prevent theft of HEU, making research reactors a prime target for terrorists seeking to obtain nuclear material (Bunn, 2010, 45). If a terrorist group only acquires nuclear material, and not a functional weapon, they will have to successfully create a weapon that they can detonate. Unfortunately, this is an achievable end that can be done with little resources or expertise. As discussed above, Highly Enriched Uranium is pure enough that it can be made into a devastating weapon relatively easily, and it is also the most likely nuclear material that terrorists would get their hands on. The perception of modern nuclear weapons may be that they are highly technical instruments of warfare backed by complex science. While this may be true, a “crude” nuclear weapon, one that takes little skill to create, would still be incredibly deadly—capable of destroying the downtown of a major city (Bunn, 2010, 16). The process of building a weapon of this type is not entirely simple, and anyone who wanted to construct such a device would need a technical team with at least some experience. However, in comparison to the nuclear weapons manufactured today, a crude bomb would be a more feasible project, as it would not have to comply with rigorous military and safety specifications. Thus, it is plausible to see that this kind of power is not out of reach for dedicated terrorist groups, should they acquire nuclear material (Ferguson & Potter 2003, 116). Having acquired nuclear material and created a weapon, the final obstacle a terrorist group would need to pass would be delivery and detonation in the target location. Likely, this would involve them smuggling a bomb or device into the United States, and then into a major city, undetected. Nuclear material is quite difficult to track, especially the small amounts that would be needed for a crude weapon (Bunn 2010, 18). Journalists have repeatedly demonstrated the ease with which radioactive materials can be transported and shielded from detection while traveling (Ferguson & Potter 2003, 141). Even with the most advanced technology, HEU is among the most difficult kind of radiological material to detect (Montgomery 2009, 79). Also, terrorists could use existing port and transport systems in place, as they are relatively unsecure. Customs and Border Patrol inspects only around 6% of cargo containers entering the US (Medalia 2005). Even with increased security measures and Port Authority reorganization in 2003, there are still plausible scenarios for terrorist groups sneaking radioactive materials into the US via boat undetected (Ferguson & Potter 2003, 300). Furthermore, terrorists could avoid this obstacle entirely by taking materials that were already inside the US. Once inside the US, delivery and detonation to target site would also not be insurmountable. As Matthew Bunn and E. P. Maslin write: The length of national borders, the diversity of means of transport, the vast scale of legitimate traffic across borders, and the ease of shielding the radiation from plutonium or especially from HEU all operate in favor of the terrorists. Building the overall system of legal infrastructure, intelligence, law enforcement, border and customs forces, and radiation detectors needed to find and recover stolen nuclear weapons or materials, or to interdict these as they crossnational borders, is an extraordinarily difficult challenge. (Bun & Maslin 2010) In order for a terrorist group to be “successful” in carrying out a nuclear attack, many elements must come together. There is no doubt that the end result of a nuclear terrorist attack would be terrible, so even with a low probability of attack, the high impact possibility means steps should still be taken to prevent it. In each link of the chain of attack, there are security measures that have been put in place, and continue to be upgraded. However, as discussed above, there are still vulnerabilities in each step of the process that, if they all were orchestrated together, terrorists could exploit to pull off an attack with a nuclear weapon. The most critical of these links is acquisition of a bomb or nuclear material, because it is the only one that truly prevents an attack from occurring. Once a terrorist group has nuclear material, they can find people willing to make it into a usable weapon if they cannot themselves.

#### Causes retaliation and global nuclear war – only the plan solves.

Patrick F. Speice, Jr., Feburary 2006, is an associate in Gibson, Dunn & Crutcher's Washington, D.C. office, works in the firm’s International Trade Regulation and Compliance Department, focusing on export controls, foreign regulations, and economic sanctions, earned his J.D. in 2006 from the Marshall-Wythe School of Law at the College of William & Mary, William and Mary Research Fellowpolitical science, Wake Forest University, authored or co-authored professional articles, includes representation of clients in Foreign Corrupt Practices matters and securities investigations, “Negligence and Nuclear Nonproliferation,” William & Mary Law Review, Lexis Nexis

Accordingly, there is a significant and ever-present risk that terrorists could acquire a nuclear device or fissile material from Russia as a result of the confluence of Russian economic decline and the end of stringent Soviet-era nuclear security measures. 39 Terrorist groups could acquire a nuclear weapon by a number of methods, including "steal[ing] one intact from the stockpile of a country possessing such weapons, or ... [being] sold or given one by [\*1438] such a country, or [buying or stealing] one from another subnational group that had obtained it in one of these ways." 40 Equally threatening, however, is the risk that terrorists will steal or purchase fissile material and construct a nuclear device on their own. Very little material is necessary to construct a highly destructive nuclear weapon. 41 Although nuclear devices are extraordinarily complex, the technical barriers to constructing a workable weapon are not significant. 42 Moreover, the sheer number of methods that could be used to deliver a nuclear device into the United States makes it incredibly likely that terrorists could successfully employ a nuclear weapon once it was built. 43 Accordingly, supply-side controls that are aimed at preventing terrorists from acquiring nuclear material in the first place are the most effective means of countering the risk of nuclear terrorism. 44 Moreover, the end of the Cold War eliminated the rationale for maintaining a large military-industrial complex in Russia, and the nuclear cities were closed. 45 This resulted in at least 35,000 nuclear scientists becoming unemployed in an economy that was collapsing. 46 Although the economy has stabilized somewhat, there [\*1439] are still at least 20,000 former scientists who are unemployed or underpaid and who are too young to retire, 47 raising the chilling prospect that these scientists will be tempted to sell their nuclear knowledge, or steal nuclear material to sell, to states or terrorist organizations with nuclear ambitions. 48 The potential consequences of the unchecked spread of nuclear knowledge and material to terrorist groups that seek to cause mass destruction in the United States are truly horrifying. A terrorist attack with a nuclear weapon would be devastating in terms of immediate human and economic losses. 49 Moreover, there would be immense political pressure in the United States to discover the perpetrators and retaliate with nuclear weapons, massively increasing the number of casualties and potentially triggering a full-scale nuclear conflict. 50 In addition to the threat posed by terrorists, leakage of nuclear knowledge and material from Russia will reduce the barriers that states with nuclear ambitions face and may trigger widespread proliferation of nuclear weapons. 51 This proliferation will increase the risk of nuclear attacks against the United States [\*1440] or its allies by hostile states, 52 as well as increase the likelihood that regional conflicts will draw in the United States and escalate to the use of nuclear weapons. 53

#### By itself terrorism causes extinction.

Owen B. Toon, 4-19-2007, is professor of Atmospheric and Oceanic Sciences and a fellow at the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado received his Ph.D. from Cornell University, in cloud physics, atmospheric chemistry and radiative transfer, “Atmospheric effects and societal consequences of regional scale nuclear conﬂicts and acts of individual nuclear terrorism,” Atmosphere Chemistry Physics

To an increasing extent, people are congregating in the world’s great urban centers, creating megacities with popula- tions exceeding 10 million individuals. At the same time, ad- vanced technology has designed nuclear explosives of such small size they can be easily transported in a car, small plane or boat to the heart of a city. We demonstrate here that a sin- gle detonation in the 15 kiloton range can produce urban fa- talities approaching one million in some cases, and casualties exceeding one million. Thousands of small weapons still ex- ist in the arsenals of the U.S. and Russia, and there are at least six other countries with substantial nuclear weapons invento- ries. In all, thirty-three countries control sufficient amounts of highly enriched uranium or plutonium to assemble nuclear explosives. A conflict between any of these countries involv- ing 50-100 weapons with yields of 15kt has the potential to create fatalities rivaling those of the Second World War. Moreover, even a single surface nuclear explosion, or an air burst in rainy conditions, in a city center is likely to cause the entire metropolitan area to be abandoned at least for decades owing to infrastructure damage and radioactive contamina- tion. As the aftermath of hurricane Katrina in Louisiana sug- gests, the economic consequences of even a localized nuclear catastrophe would most likely have severe national and inter- national economic consequences. Striking effects result even from relatively small nuclear attacks because low yield det- onations are most effective against city centers where busi- ness and social activity as well as population are concen- trated. Rogue nations and terrorists would be most likely to strike there. Accordingly, an organized attack on the www.atmos-chem-phys.net/7/1973/2007/ Atmos. Chem. Phys., 7, 1973–2002, 2007 Page 28 2000 O. B. Toon et al.: Consequences of regional scale nuclear conflicts U.S. by a small nuclear state, or terrorists supported by such a state, could generate casualties comparable to those once predicted for a full-scale nuclear “counterforce” exchange in a superpower conflict. Remarkably, the estimated quantities of smoke generated by attacks totaling about one megaton of nuclear explosives could lead to significant global climate perturbations (Robock et al., 2007). While we did not ex- tend our casualty and damage predictions to include poten- tial medical, social or economic impacts following the initial explosions, such analyses have been performed in the past for large-scale nuclear war scenarios (Harwell and Hutchin- son, 1985). Such a study should be carried out as well for the present scenarios and physical outcomes.

### Advantage 2

Is Peak Energy

#### Peak energy is coming – extinction

Charles E. Till & Yoon Il Chang, 2011, longtime Associate Laboratory Director for Engineering Research at Argonne National Laboratory, directed civilian nuclear power reactor development at Argonne National Laboratory, PhD Engineering, Specialty Reactor Physics, Imperial College, University of London, National Research Council of Canada, United Kingdom Atomic Energy Authority , Fellow of the American Nuclear Society, awarded the Walker Cisler Medal, National Academy of Engineering, was at Argonne National Laboratory, General Manager of the Integral Fast Reactor Program, Associate Laboratory Director for Engineering Research, Interim Laboratory Director, Argonne Distinguished Fellow, Currently he also serves as the Chair of IAEA’s Technical Working Group on Nuclear Fuel Cycle Options and Spent Fuel Management, was awarded the U.S. Department of Energy’s prestigious E.O. Lawrence Award, a Fellow and a recipient of the Walker Cisler Medal of American Nuclear Society, M.E. in Nuclear Engineering from Texas A&M University, and his Ph.D. in Nuclear Science from The University of Michigan, Science Council for Global Initiatives (SCGI), Plentiful Energy: The Story of the Integral Fast Reactor, p. 82, Amazon.com

All in all, carbon and hydrocarbon availability will also certainly peak and diminish in the next twenty-five years or so. Populations and energy demand will, on the other hand, continue to increase, exponentially if the past is a guide. All the “alternative energy” sources, as defined by environmental groups, with some possible but limited exception in bio-fuels, will come to nothing on the scale of energy replacement required. Physical limitations guarantee this. Nuclear energy has no such physical limitations. Its predicted role, however, remains marginal in all accepted mainstream predictions of future energy supplies. Again, the reasons are obvious, and directly attributable to the successful anti-nuclear campaigns of organized environmental groups. The only result of this path, unaltered, is increasing shortage of energy—life-changing draconian. A perusal of the current literature will demonstrate that this kind of future is looked upon with equanimity, even with enthusiasm, by those who push “alternative energies.” It is a utopian recipe for global disaster. And it will not happen. Civilizations, nations, will do their best to maintain their energy supplies and do whatever is necessary. The most realistic, and peaceful, avenue is plentiful electricity supplied by nuclear power. It will not substitute directly for all other forms of energy. But it will provide limitless electrical power. Electricity is very adaptable, and if you have it abundantly a lot of substitution can be done. A great deal of nuclear capacity will be required. Military might is not required. Attention is. Comfortable views of nuclear power as a small element of the global energy picture are common enough. The recent report, “Nuclear Power Joint Fact-Finding” by the Keystone Center [5], is an excellent example of this. In essence, they extrapolate the situation today, where nuclear energy is a useful but small contributor to U.S. energy overall, and surveying the present state of the nuclear industry in the U.S., conclude that there will be difficulty in maintaining even this. There is no evidence of any alarm at this. The important, the all-important point, is evaded completely: the carbon-based energy system that we have relied upon completely for our nation’s well-being is now endangered. This is not to happen far out in the future; masked somewhat by the recession, it is happening now. Real additions of large magnitude to energy supplies are absolutely essential. The alternative is conflict—military action, if history is any guide, as nations fight for energy resources; or pushed further, some scenario of the doomsayers whose theme is the inevitability of the collapse of civilization. The situation is serious, and it is made more serious by the fact that it is not generally recognized as such and little of use is being done. And if nuclear power is to fill the role that must be assigned to it, the IFR or something very similar is needed. In any event, the principle reactor type must possess breeding characteristics very similar to the IFR. We will turn now to the apparent facts and the evidence underpinning them, and then go on to our principal purpose and the subject of this book, the technical features of the IFR itself. But first, we will examine further the evidence for its need.

#### Decrease in fossil fuel imports hasn’t changed our energy vulnerabilities – without a new energy paradigm coming price shocks will cause hollowing out of the economy and war.

Gal Luft & Anne Korin, July/August 2012, co-directors of the Institute for the Analysis of Global Security (IAGS) and senior advisers to the United States Energy Security Council, They are co-authors of Turning Oil into Salt: Energy Independence through Fuel Choice and Petropoly: The Collapse of America’s Energy Security Paradigm, The American Interest, “The Folly of Energy Independence,” <http://www.the-american-interest.com/article.cfm?piece=1266>

In recent years America’s volume of imported oil has dropped significantly even as the price we have paid and are still paying for it has sharply increased. It follows, then, that the policy options we ought to consider differ significantly from those of the past half century. Yet there seems to be something seriously the matter with our mental clutch. We’re stuck in the wrong gear, and we’re not getting anywhere. That needs to change, now. Up to Speed To understand more fully what the problem is and what we need to do about it, consider that in recent years America’s energy landscape has turned a corner—not thanks to, but largely despite, the actions of the U.S. government. U.S. net imports of petroleum declined from 12.5 million barrels per day (mbd) in 2005 to 8.6 mbd in 2011. U.S. import dependence dropped from its 60 percent peak in 2005 to 46 percent, the level it was back in 1995. This 30 percent reduction in just seven years in the level of imports is equivalent to three times the number of barrels nominally imported from Saudi Arabia. Some of the reduction is due to a recession-induced drop in consumption; some has to do with increased vehicle fuel efficiency standards; some with a ramp up in ethanol blending; and some with a ramp up in domestic oil production. Since 2008, technologies like deep-water drilling, hydraulic fracturing and horizontal drilling have increased U.S. crude oil output by 18 percent. In the past year alone, the U.S. onshore rig count has grown by 30 percent. About a million barrels per day emerged from a new source, tight oil, which is extracted from dense rocks. North Dakota, the center of the tight oil transformation, has become the fourth largest oil-producing state behind Texas, Alaska and California. For the first time in decades, the United States is experiencing an oil boom—or at least a boomlet. But while America’s oil imports dropped, its foreign oil expenditures climbed by almost 50 percent, from $247 billion in 2005 to $367 billion in 2011. The share of oil imports in the overall trade deficit grew from 32 percent in 2005 to 58 percent in 2011. The price of a gallon of regular gasoline nearly doubled. Despite lower demand, U.S. drivers spent more last year on gasoline than in any prior year. Clearly, and surprisingly to those trapped in old ways of thinking, the volume of U.S. imports and the cost of those imports have moved in opposite directions. While America became more self-sufficient and more fuel-efficient, it became poorer and got deeper in debt. If one accepts the traditional mantra of energy security as “availability of sufficient supply at affordable prices”, then whatever points we gained on the availability front were offset by those lost on the affordability side of the ledger. The latter matters more—especially in a time of economic adversity. All but two of the post-World War II recessions were preceded by a sharp spike in oil prices; there is no question that the fivefold increase in oil prices since 2003 has contributed to the current economic dislocation. For perspective, forty years ago, at the zenith of the Cold War, the United States spent $4 billion on oil imports, an amount that equaled 1.2 percent of the defense budget. In 2006, the United States paid $296 billion, equal to half of the defense budget. By 2008, U.S. foreign oil expenditures grew so much they almost equaled the entire defense budget. The energy security paradox of the 21st century, then, is that a country can reduce oil imports but end up paying a much higher oil import bill. What this means is that, given the current state of the global economy, a new oil shock—whether caused by war in the Persian Gulf, instability in North Africa or Nigeria, or even anxious investors rushing to buy oil futures to hedge against falling currencies—would sink Western economies. As it is, the rising cost of oil is hollowing out the U.S. economy, and no fuel economy standards or new oil discovery will stop this tide. What is needed is a new energy paradigm.

#### We could start building hundreds of reactors by 2015 – cost competitive option.

Steve Kirsch, 2011, M.S. Massachusetts Institute of Technology (MIT), writer for the Huffington Post, CEO Kirsch foundation on climate, founder/head of Center for Energy and Climate Change, National Award from the Caring Institute in Washington DC, written much about the Integral Fast Reactor, Fellow, with the Science Council for Global Initiatives (SCGI), Steve Kirsch’s blog, “The Integral Fast Reactor (IFR) project: Q&A,” <http://skirsch.com/politics/globalwarming/ifrQandA.htm>

\*\*\*cites Charles Till, former Associate Director, Argonne National Laboratory, The National Academy Studies, James Hansen, Director, NASA Goddard Institute for Space Studies, Ray Hunter, former Deputy Director of the Office of Nuclear Energy, Science and Technology in the U.S. Department of Energy (DOE), Leonard Koch, winner of the Global Energy International Prize, Barry Brook Sir Hubert Wilkins Chair of Climate Change\*\*\*

I do not agree that nuclear energy would be "a costly option," especially given a level playing field (external health and environmental costs considered, for instance). Nuclear power is now competitive in many countries, and there is no reason to think that fast reactors, in the long run, will be significantly more expensive. They will require no mining, no milling, no enrichment, and the waste-management expense will be negligible. The raw material for the fuel (used fuel already on hand) is essentially free. Virtually the entire cost will be in infrastructure and operations. It's likely if we made this a national priority, it could move a lot faster (like we did with the Manhattan Project). The argument that it might take a long time is an argument for starting immediately. Nobody, even the critics, have suggested that waiting around makes it happen faster when we finally need to do it. We need to get out from under a "let's just pursue the quick fixes" mentality we have now. The time to do these longer term projects is before they are needed. Are we going to wait for our existing nuclear material to be depleted before it is a crisis? And then, once again, we will be too late. We need forward, visionary thinking in this country. It seems to be in short supply. Here's what Blees wrote in response to my answer above: I couldn't agree more. That said, I'm certain it could be done expeditiously and we could start building these things by the hundreds by 2015 or so. Meanwhile we could start building ABWRs and the other Gen III+ reactors so we could start shutting down coal plants. Nuclear waste is simply not an issue. And in terms of building both Gen III and IFRs in nuclear-capable countries, neither is economics. Or safety. Or proliferation. Those who maintain that we don't have the technology are either ignorant of the facts or lying. Not to put too fine a point on it or anything. That's not something I'd just toss out there, but just between you and me that's the way I see it.

#### Global economic crisis causes war - strong statistical support - also causes great power transitions.

Jedediah Royal, 2010, Director of Cooperative Threat Reduction at the U.S. Department of Defense, “Economic Integration, Economic Signaling and the Problem of Economic Crises,” in Economics of War and Peace: Economic, Legal and Political Perspectives, ed. Goldsmith and Brauer, p. 213-14

Less intuitive is how periods of economic decline may increase the likelihood of external conflict. Political science literature has contributed a moderate degree of attention to the impact of economic decline and the security and defence behaviour of interdependent states. Research in this vein has been considered at systemic, dyadic and national levels. Several notable contributions follow. First, on the systemic level, Pollins (2008) advances Modelski and Thompson’s (1996) work on leadership cycle theory, finding that rhythms in the global economy are associated with the rise and fall of pre-eminent power and the often bloody transition from one pre-eminent leader to the next. As such, exogenous shocks such as economic crises could usher in a redistribution of relative power (see also Gilpin, 10981) that leads to uncertainty about power balances, increasing the risk of miscalculation (Fearon, 1995). Alternatively, even a relatively certain redistribution of power could lead to a permissive environment for conflict as a rising power may seek to challenge a declining power (Werner, 1999). Seperately, Polllins (1996) also shows that global economic cycles combined with parallel leadership cycles impact the likelihood of conflict among major, medium, and small powers, although he suggests that the causes and connections between global economic conditions and security conditions remain unknown. Second, on a dyadic level, Copeland’s (1996,2000) theory of trade expectations suggests that ‘future expectation of trade’ is a significant variable in understanding economic conditions and security behavior of states. He argues that interdependent states are likely to gain pacific benefits from trade so long as they have an optimistic view of future trade relations. However, if the expectation of future trade decline, particularly for difficult to replace items such as energy resources, the likelihood for conflict increases , as states will be inclined to use force to gain access to those resources. Crises could potentially be the trigger for decreased trade expectations either on its own or because it triggers protectionist moves by interdependent states. Third, others have considered the link between economic decline and external armed conflict at a national level. Blomberg and Hess (2002) find a strong correlation between internal conflict and external conflict, particularly during periods of economic downturn. They write, The linkages between internal and external conflict and prosperity are strong and mutually reinforcing. Economic conflict tends to spawn internal conflict, which in turn returns the favour. Moreover, the presence of a recession tends to amplify the extent to which international and external conflicts self-reinforce each other. (Blomberg & Hess, 2002, p.89). Economic decline has also been linked with an increase in the likelihood of terrorism (Blomberg, Hess, & Weerapana, 2004), which has the capacity to spill across borders and lead to external tensions. Furthermore, crises generally reduce the popularity of a sitting government. ‘Diversionary theory’ suggests that, when facing unpopularity arising from economic decline, sitting governments have increased incentives to create a ‘rally round the flag’ effect. Wang (1996), DeRouen (1995), and Blomberg, Hess and Thacker (2006) find supporting evidence showing that economic decline and use of force are at least indirectly correlated. Gelpi (1997) Miller (1999) and Kisanganie and Pickering (2009) suggest that the tendency towards diversionary tactics are greater for democratic states than autocratic states, due to the fact that democratic leaders are generally more susceptible to being removed from office due to lack of domestic support. DeRouen (2000) has provided evidence showing that periods of weak economic performance in the United States, and thus weak presidential popularity, are statistically linked to an increase in the use of force.

#### Pyro-processing could solve our energy needs and the economy – four times global oil reserves and the multiplier effect.

Joseph Shuster, 9-8-2011, Ph.D. University of Minnesota, is a chemical engineer, who has spent his entire career in engineering in energy-related issues, he co-founded Minnesota Valley Engineering, founded or co-founded seven other technology based companies and has served on the Board of Directors of over twenty international firms, accurately predicted the oil embargo of 1973 in an energy report he wrote for the U.S. Congress, Response to Draft Report From Obama’s Blue Ribbon Commission (BRC) on America’s Nuclear Future, “Most Commissioners Were Not Qualified,” p. 2, <http://www.beyondfossilfools.com/assets/files/BRCresponse.pdf>

Fixing America’s energy problems over the next 30 years would add approximately 2% per year to the country’s GDP. The multiplier effect could raise this to as much as 10%-- jobs galore. This prospect should have excited politicians and bureaucratic on the commission. Few major initiatives promise such a robust return. Of course, the most important benefits would be abundant clean energy to support the economies of the world and for our children a clean and healthy environment and energy security. An Unbelievable Omission As an alternative to long term storage (300,000Yrs.) of so-called nuclear “waste”, the commission should have presented the alternative of recycling this “waste” along with all the advantages recycling provides. They chose to ignore this elegant technology, but we won’t. Let’s take a look. So-called nuclear “waste” is not really a waste: The energy value that can be recovered from the U.S. stockpile of approximately 62,000 tons of nuclear waste and 600,000 tons of depleted uranium is equivalent to 4.5 trillion barrels of oil. That is 4 times the known global oil reserves. This vast source of carbon free energy can be unlocked from this waste with technologies that were successfully developed in our own U.S. National Laboratories over a 30 year period at a cost of more than $3 billion dollars. The technologies referenced are Generation IV Integral Fast Reactors (IFRs) and the pyroprocessing of nuclear waste which reduces the volume of waste and provides fuel for use in IFRs. When the original waste produced from today’s Light Water Reactors (LWRs) is recycled and burned in IFRs the volume of waste is reduced by 95%, and needs to be stored for only 300 years instead of 300,000 years required today. Another advantage is that through the recycling process and the use of IFRs, more than 100 times more energy is extracted from the original uranium fuel. Abundant information regarding recycling nuclear waste and IFRs was provided by me and others to the commission. It is difficult to understand why full consideration was not given to these important, advanced technologies. This may be the result of simply unqualified individuals being on the commission.

#### Conversion to borocars will happen immediately – PRISM fuel is key

Tom Blees, 2008, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, Prescription for the Planet, p. 165

Already five years ago oxygen extractors were almost small enough, even with their efficiency being barely 5% of the theoretical limit. Give that challenge to the wizards at Sandia Labs and sit back and watch the fur fly. We’ll be tooling around in borocars in a heartbeat. On the other hand, there are a lot of new electric car technologies on the horizon that seem to show great promise, from the aforementioned Phoenix to high-tech capacitor systems. And work being done on so-called flow batteries holds out the possibility of being able to simply pump out discharged electrolytes and pump in a fully charged solution, which wouldn’t take much longer than fueling up with gasoline today. It’s possible that by the time this book is in your hands a viable electric car will be on the road. What 165 use for boron then? Well, you still have that home in Winnipeg, remember? And long trips in remote areas could be impossible with all-electric vehicles, though for most uses they would be just peachy. The average car trip in America is about 29 miles, so usually it would work just fine to plug in at home. If Phoenix Motorcars actually succeeds in building a car with long range per charge and a ten minute charge cycle as they’re promising, admittedly the need for boron will be minimized. Nevertheless it could well be used in trucks, trains, heavy equipment, portable generators, or for safely and cheaply transporting energy in areas (such as much of the developing world) where power grids are inadequate or nonexistent. Our Winnipeg family could get by just fine with an electric car, though, as long as they kept a boron powered generator out in the garage. A boron/electric hybrid, however, would be the best of both worlds. Not only would you have terrific range even beyond the grid, but the charging cable that plugs into your house every night (assuming we make these plug-in hybrids) could operate in reverse if the power went out. All you’d have to do is start the car to kick in the boron power. Of course with a truly efficient boron/electric hybrid you might drive around with a tank of boron for months before ever having occasion to use it. Would that be a bad thing? Absolutely not. From an efficiency standpoint it would be the best situation. Any time energy is converted from one form to another it incurs an energy penalty. So it would be more efficient just to use electricity straight from the IFR to charge up our cars. Dependable boron/electric hybrids would mean only that we’d need fewer boron recycling plants, saving both money (especially the high capital cost) and energy.

#### Fossil fuel production by powerhouses like Saudi Arabia are falling the status quo – no other substitutes because of the size of U.S. imports, this means nuclear is the only option.

Charles E. Till & Yoon Il Chang, 2011, longtime Associate Laboratory Director for Engineering Research at Argonne National Laboratory, directed civilian nuclear power reactor development at Argonne National Laboratory, PhD Engineering, Specialty Reactor Physics, Imperial College, University of London, National Research Council of Canada, United Kingdom Atomic Energy Authority , Fellow of the American Nuclear Society, awarded the Walker Cisler Medal, National Academy of Engineering, was at Argonne National Laboratory, General Manager of the Integral Fast Reactor Program, Associate Laboratory Director for Engineering Research, Interim Laboratory Director, Argonne Distinguished Fellow, Currently he also serves as the Chair of IAEA’s Technical Working Group on Nuclear Fuel Cycle Options and Spent Fuel Management, was awarded the U.S. Department of Energy’s prestigious E.O. Lawrence Award, a Fellow and a recipient of the Walker Cisler Medal of American Nuclear Society, M.E. in Nuclear Engineering from Texas A&M University, and his Ph.D. in Nuclear Science from The University of Michigan, Science Council for Global Initiatives (SCGI), Plentiful Energy: The Story of the Integral Fast Reactor, p. 87-8, Amazon.com

The giant oil fields are found first. Because of this, there have been few such discoveries since 1980 even with improvements in exploration. A few have been found in deep water in the Gulf of Mexico, Brazil and West Africa, and in the Caspian Sea, but very, very few compared to the discoveries up to the 1960s. The giants the world has depended on for decades are all either proven to be in decline or are thought to be approaching it. Eighty percent of the world’s oil comes from fields over twenty-five years old. Oil production today outweighs new discoveries by a large factor, quoted variously as between three and nine. The one super-giant, the Ghawar field in Saudi Arabia, alone produces over four million barrels a day. It too is old. The sustainability of tis present production is the subject of much debate, but there is good reason to believe that it may be approaching, or is actually in decline. There is nothing remotely like it to replace it. The other three fields that make up the four responsible for 10 percent of the world’s production, in addition to Ghawar, are Burgan in Kuwait, which supplies about two million bbl/day, and Canterell in Mexico and Daqing in China, both of which supply about one million bbl/day. None are thought to be capable of increases, and all are either suspected to be, or have actually proven to be, in decline. Liquids associated with natural gas, add some production, and the relatively small remainder is “non-conventional oil.” Non-conventional oil is high cost, from hostile locations, deep water, or from heavy oils, tars and bitumens. The resource base of the latter is large—bigger than for conventional oils. But the massive scale of recovery operations, limitations due to environmental concerns (both direct damage during extraction and broader greenhouse issues), and the smaller net energy difference between the product and the production operation, make these sources far inferior to the flows from the giants. They will be important during, and after, conventional oil production declines, but the production rate inevitably will be limited. There is some thought that the very large resources of shale oil will be developed under a high priced scenario. One thing is clear: production rates will be very limited, and the resource amounts are large. So if shale oil production is feasible there will be a very long, but ultimately limited supply of oil to augment other more ample sources of energy. This oil picture is troubling. The bare facts are enough to raise concern. The magnitude of our oil use, two thirds of which is imported, makes energy independence for the U.S. impossible. Domestic fossil fuels have been abundant and cheap historically in the U.S. and many other countries, have provided all the energy of every kind that this nation needed, and have fueled what has been the world’s most vibrant economy. In recent decades, increasing shortfalls in domestic energy production have been masked by increasing imports of oil, and also, to a degree, of natural gas from Canada. Oil imports have become immense. Much is made at the moment of the need for off-shore drilling, and of “alternative energies” deriving from the sun each day. In the routine of politics it’s said that policy changes regarding one or the other, but not both, will bring renewed energy independence for this country. It can be said flatly and with complete certainty that the magnitude of our oil imports makes this impossible. Our oil imports alone are fully one sixth of the total oil production of the entire world. No discoveries off-shore can substantially offset such amounts, nor can all the sun-based alternatives that could in any way possibly be marshaled. Present energy supply practices cannot be sustained indefinitely. There is nothing in prospect to replace energy imports of these magnitudes, nothing that can begin to match magnitudes of this kind. The view that things will continue much as always, with plentiful energy fueling the American economy, must confront facts that appear to tell a much different story. U.S. oil imports are a substantial fraction of all oil on the world’s market. If the very magnitude of the amount of fossil fuels consumed today is the most important fact, it is followed closely by the dramatic changes in the distributions of production and consumption of oil and natural gas. Oil production in the U.S. peaked four decades ago. At that time the U.S. produced a quarter of the world’s oil and was close to self-sufficient. U.S. production has steadily declined since; it is now less than ten percent of world production. The Alaskan field added a temporary “bump” to the decline, but it too is now in steep decline. Imports have increased to the point where the U.S. alone imports a third of all the oil available on the world’s markets after indigenous usage in the producing states is taken out. With world economies growing, fueled by oil, it is not hard to see trouble ahead—world oil production cannot increase apace. Recent rises and market volatility in oil and gasoline prices begin to suggest what lies ahead.

#### Nuclear power is the most economic source of base-load power - displaces fossil-fuel combustion while remaining competitive.

Alexander DeVolpi, 2-28-2010, been active in nuclear-arms policy and treaty-verification technology studies for over 25 years, Argonne National Laboratory, Argonne, Illinois (and other national laboratories) involved nearly 40 years of lab, field, and analytical activities in instrumentation, nuclear physics, nuclear engineering, reactor safety, radioisotopes, experiments, verification technology, and arms control, the Defense Nuclear Agency, On-Site Inspection Agency, all the Department of Energy weapons labs, with the Departments of Defense and State, author or coauthor of several books, Ph.D. in physics (and MS in nuclear engineering physics) from Virginia Polytechnic Institute, certificate from the Argonne International Institute of Nuclear Science and Engineering, managing nuclear diagnostics for the Reactor Analysis and Safety Division at Argonne, and becoming technical manager of the arms-control and nonproliferation program, Who’s Who in Frontiers of Science and Technology, American Men and Women of Science, fellow of the American Physical Society, technical consultant in the Federation of American Scientists/Natural Resources Defense Council joint project, ScienceTechnologyHistory, “NUCLEAR EXPERTISE: The Amory Lovins Charade,” <http://sciencetechnologyhistory.wordpress.com/article/nuclear-expertise-the-amory-lovins-1gsyt5k142kc5-20/>

Moreover, if Lovins had his way, we would not have conserved the electricity-equivalent in domestic coal, imported and domestic oil, and domestic and imported natural-gas resources and reserves that we have for 30 years. A typical nuclear power plant each year avoids consumption of 3.4 million short tons of coal, or 65.8 billion cubic feet of natural gas, or 14 billion barrels of oil. (The United States has ample uranium resources.) So Lovins was wrong in implying that nuclear had no overriding societal or environmental benefits. Incidentally, it’s no accident that Illinois has the highest concentration of nuclear-power plants in the United States: Argonne National Laboratory can be proud of its half-century nuclear stewardship. (California, by the way, generates more electricity from geothermal, solar, and wind energy sources combined than any other State.) Lovins displayed complex viewgraphs that, he purports, show that nuclear is the costliest of “low-or-non-nuclear resources.” Yet, in the last 30 years, nuclear has displaced half the fossil-fuel combustion in Illinois while still being competitive. Inasmuch as nuclear-power plants emit no byproduct carbon-dioxide to the atmosphere, surely his claim that it is the costliest of low-carbon-emission sources fails the smell test. Most of Lovins’ pricing and cost/benefit comparisons are based on “new delivered electricity” which frames the cost of U.S. domestic nuclear construction in the least favorable light. He declares nuclear power an economic failure. Can someone explain that to my bank account which has benefitted from compounding competitive electric power savings for the past 30 years? His rimy claim certainly fails the ripeness test. On the issue of electrical-grid reliability, Lovins asserts that there is no such thing as a “outage-free” source of electrical power. He must think that nuclear power runs by government fiat. Nuclear is a fixture on the grid because it is more economical to operate as base-load supply, while sources less reliable, intermittent, and more costly (such as wind, solar, and gas) provide supplementary power. During the past 30 years in Illinois, I don’t recall having the electricity supply and cost problems that California has had after it prohibited nuclear-power plants from being built within its borders. By the way, average U.S. nuclear capacity factor was about 92% in 2007. That’s excellent. Lovins pitiful effort to undermine the reliability of nuclear power egregiously fails the smell test.

#### Natural gas won’t serve as a bridge for a renewables transition – price shocks and link to peak oil.

Charles E. Till & Yoon Il Chang, 2011, longtime Associate Laboratory Director for Engineering Research at Argonne National Laboratory, directed civilian nuclear power reactor development at Argonne National Laboratory, PhD Engineering, Specialty Reactor Physics, Imperial College, University of London, National Research Council of Canada, United Kingdom Atomic Energy Authority , Fellow of the American Nuclear Society, awarded the Walker Cisler Medal, National Academy of Engineering, was at Argonne National Laboratory, General Manager of the Integral Fast Reactor Program, Associate Laboratory Director for Engineering Research, Interim Laboratory Director, Argonne Distinguished Fellow, Currently he also serves as the Chair of IAEA’s Technical Working Group on Nuclear Fuel Cycle Options and Spent Fuel Management, was awarded the U.S. Department of Energy’s prestigious E.O. Lawrence Award, a Fellow and a recipient of the Walker Cisler Medal of American Nuclear Society, M.E. in Nuclear Engineering from Texas A&M University, and his Ph.D. in Nuclear Science from The University of Michigan, Science Council for Global Initiatives (SCGI), Plentiful Energy: The Story of the Integral Fast Reactor, p. 89, Amazon.com

Natural gas is linked to oil. It has been suggested that a “natural gas bridge” is possible when oil production falls, “bridging” the gap between oil scarcity and some new non-fossil source of energy, typically wind or sun. Peak gas, however, is linked to peak oil in a fundamental way. World gas supplies, even today, are not assured, and will decline, loosely linked to oil. Demand projections for world electricity forecast annual growth rates approaching 9 percent or so; all assume, either explicitly or implicitly, that “abundant and cheap,” as well as “environmentally friendly” natural gas will take increasing load. No practical credence can be given to suggestions that wind farms or other new, dilute, and variable “alternative energy sources” will make a meaningful contribution. Without cheap gas, the “gas bridge” to “alternative energy sources” will make a meaningful contribution. Without cheap gas, the “gas bridge” to “alternative energy sources” collapses. The other end of the “bridge” exists in imagination only. Most U.S. gas comes from gas-only fields, although worldwide it is produced principally where oil is found. Gas is found in three types of formation: associated gas, the gas occurring in associated oil fields; non-associated gas, the dry gas from conventional gas fields with identifiable boundaries; and unconventional, continuous gas fields in tight formations, coal bed gas, and shale. The first two have discrete boundaries, high permeability, and consequent high recoveries. Unconventional gas fields have more diffuse boundaries, low permeability, and consequently low (and consequently more expensive) recoveries.

#### Energy competition is likely – predictions by consensus of knowledgeable institutions and observers.

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Soon the world’s energy need will no longer be dominated by the western world. By 2030 China will have passed the U.S. in energy consumption. Oil production at best will have long since reached a plateau. Severe competition for imports of oil can be expected, as the two biggest users of oil are the two biggest importers and the two most powerful nations on earth. Electricity growth will be very robust; electricity will near 50% of total primary energy usage. Nuclear is assigned only a small part in most prognostications, non-trivial, but small and constant. But note carefully: for these predictions to be explainable, all growth had to be assigned to coal and natural gas. The scenarios foreseen by a number of knowledgeable institutions and observers regarding peak production rates are quite similar. There is disagreement on the dates of the various peaks, but with a surprising degree of agreement considering the disparate interests of those involved. The graph below shows the main points. It is taken from the Association for the Study of Peak Oil (ASPO) 2006 Base Case Scenario. [13-14] Here they show that global production of conventional oil peaked in 2006, while all liquids (including non-conventional oil) and natural gas combined will peak in approximately 2010. The combined peak of oil and gas will probably determine the peak—at least the first peak—in total world energy production and consumption.

#### Coal will peak soon because of extraction problems and resource distribution.

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Coal outlook is the least well-defined. Although coal is mined on every continent except Antarctica, it is by no means distributed uniformly. The biggest deposits are in the U.S. and Russia, with China, India and Australia following in that order. The US has 27% of the world’s coal, and coal is always thought of as our fuel of last resort. The principal point about coal, however, is that the amounts that will actually be recoverable worldwide are very poorly defined and technology dependent. The resource amounts themselves are poorly defined, some of the numbers date back to the 1970s when the first global estimates were made. Further, for coal particularly, the resource numbers are deceiving. The amount of coal that be recovered is certainly only a fraction of the resource in the ground. Current guesses are that coal production will peak globally in the range between 2025 and 2050, based solely on physical constraints. If constraints due to CO2 emissions begin to seriously enter the picture, the place of coal will be limited to an even greater degree. Carbon-based fuel will soon become increasingly unavailable. All in all, it seems evident that carbon and hydrocarbon availability will peak and diminish in the next very few decades—within the next twenty-five years, and possibly sooner. With this in prospect, it is difficult to understand the complacency with which the stagnation of nuclear power in this country continues to be accepted. Real, practical additions at magnitude must be made, and soon. Yet little is being done.

#### No form of energy except for PRISMS can displace fossil fuels – failure to start switching now means worse crunch in the long-run.

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Tar sands and oil shale recovery are constrained by shortages of gas and water for processing. The rates of extraction will always be limited. Biofuels have low net energy gains (and so require vast areas to be devoted to biomass crops) and require substantial quantities of fresh water. Other renewables, which now produce only tiny amounts of energy—solar, wind, tidal, wave, and geothermal—have some potential for increase; however, there is no credible scenario in which these could grow enough to offset projected declines in any one of the three principal fossil fuels much less all three together. The ten quads each year must come from nuclear expansion. It is routinely and airily stated that expansion of nuclear power is problematic given future constraints in the availability of uranium. Properly managed, with the right reactor deployment, this statement is completely false. Cost issues are always brought up by opponents who have, through their campaigns, sought to drive the costs up. This issue is a red herring as well—the costs of nuclear plants are in keeping with other construction, and they pay off in reliable electricity over the many decade lifetime of the nuclear plant. The findings of the 2005 DOE-funded Hirsch report [15] regarding society’s vulnerability to peak oil apply also to peak coal: time will be needed in order for society to adapt proactively to a resource-constrained environment. A failure to begin now to reduce reliance on coal will mean much greater economic hardship when the peak arrives. World fossil energy will begin to decline very soon, and there is no perfect substitute. The climate modelers and anti-nuclear activists will always point to policies with mandatory energy curtailment and societal adjustment to lower consumption levels. Policies such as these impact everything—agriculture, transport, trade, urban design, and national electrical grid systems—and everything dependent on them, including global telecommunications. Substitution of nuclear for fossil fuels is perfect for electricity. For transportation, agriculture, and other motive usages it is not—but electricity is energy and energy can be used in any number of innovative ways. No energy is no option. Will America willingly return to the simple agrarian ways dreamed by many in the environmental movement? This idea is influential in thinking today, while all forms of energy at least in this country are abundant, but will it withstand real scarcity? An America willingly retreating into the Middle Ages for lack of energy, while China builds itself in to an industrial powerhouse. Does this seem even remotely likely? Those who project with apparent satisfaction very limited nuclear power for America while all depleting resources show an increasing inability to sustain their historical role often have real political influence. They must face these facts. Will they?

#### Consensus on peak oil now – new data from oil insiders that we’ve reached the production tipping point.

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Two very different views of the world’s future oil production have challenged each other in the last decade or so, but may be coalescing somewhat at present. The so-called “economist’s view” of oil production is that oil prices increase, the amount of oil produced will rise to meet future demand. Typically forecasts are based on this assumption, resulting in forecasts of continued production growth, with no end in sight. At the other extreme is the “peak oil” view, held by a number of oil exploration geologists, but by no means all of them, that the world’s total endowment is now well enough known that a peak in world oil production can now be foreseen; once we’re there, like the peak in U.S. domestic production in 1970, decline is inevitable and irreversible. An excellent summary was recently provided by Campbell, founder of the Association for the Study of Peak Oil and Gas (ASPO) and a very experienced oil exploration geologist. [6] The IEA chief economist, Faith Birol, has recently been quoted at length to this effect [4] and IEA projections moved toward this view for the first time in World Energy Outlook 2008. [7] There is consensus now on “conventional oil” production: it’s now at its highpoint. It’s not often stated this way, but there now seems to be broad agreement that production of “conventional oil,” the free flowing “light sweet” crude that is easy and cheap to recover, has probably reached its peak level worldwide. This is a truly startling development. It is new and it has grave implications. “Peak oil” theorists used to be routinely ridiculed, but the fact is that increasing numbers of oil industry insiders, at the highest levels, are now also saying the same thing: the point of maximum production is approaching. Their comments attribute the peak to a variety of factors, but the fundamental point is an approaching inability to meet current demand growth. In this principal fact that they are in agreement with the peak oil theorists. Controversy and debate continues about the details—the oil industry people speak of it as a plateau, a long-duration peak, and the “peak oil” people forecast more rapid decline based on their observations of past oil fields in decline. But the very fact of it now seems to be largely accepted. The principle of exponential demand meeting production rates that are slowing, leveling, and declining is not altered by details. Its implications remain the same. It is true that the current recession, higher prices for oil, and the resulting lesser usage of oil to fuel a no-longer-robust economy obscure the realities somewhat at the moment. But postponing the crisis point is not the same as preparing a solution for it.

#### Resource wars defense doesn’t apply – energy imports like coal and gas create new radical security alliances which draw us into great power wars – laundry list of hotspots.

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The question to be answered is this: “How does US energy dependence, or the energy dependence of other countries, influence national security and the likelihood of getting into conflict?” Energy security is generally assumed to involve the physical security of supply. But then what is the link between energy vulnerability and U.S. national security? While it is most often discussed as oil dependence and vulnerability and the presentation will focus on this, the mechanisms may travel to gas imports or coal imports as well. Prof. Glaser then proceeded to describe the potential mechanisms that would link energy security to national security and conflict. Mechanisms that Link Energy Dependence and Conflict I. The first set of mechanisms focuses specifically on U.S. energy dependence. 1. If the U.S. ability to fight a war is based on the flow of oil, then this poses a combat vulnerability. In the Cold War when trying to prepare to fight in Europe, we did have that vulnerability. If the sea lines of communication (SLOCs) were vulnerable, it created a security problem. Right now that is not a real danger. For now, China does not have the ability to interrupt the flow of oil. Iran does have ability to cut off for an specific amount of time. Maybe a story about China-Iran alliance could claim this. This is likely far-fetched but projecting a few decades forward might make this possible, though unlikely. 2. Threats to U.S. prosperity from energy security that are sufficiently great might require the US to fight to restore prosperity. This may not be classified as “security threat” but it involves U.S. fighting in response. The Gulf War offers an example -- the oil cutoff did not hurt security, only prosperity, but we fight a war for it. The threat is not greater now than it was 10-15 yrs before that. And recently the threat is lower since 1991. This may be harder to say now with the recent Middle East uprising. The major cutoff scenario that would pose a threat is the cutoff of Saudi oil under four possible scenarios: Saudi Arabia simply decided not to sell oil However, they are unlikely to do this. Could they afford it? They probably could for a bit making it within range, but unlikely. The collapse of Saudi regime A year ago many said it was unlikely and it still is, but it is perhaps more possible due to recent uprisings. This is a real danger here. Press and Gholz identify a Saudi cutoff as large enough threat to justify the use of force. But could the U.S. effectively intervene and restore the flow of oil if there was a clear disruption? This is uncertain. The prospect of Saudi facilities being attacked This poses a possible source of outside disruption. Another possible scenario is a cutoff of oil supply from the Strait of Hormuz This scenario has been examined but not with a nuclear Iran, which would be more capable than a conventional Iran of cutting off this supply. 3. Energy-motivated alliances -- Another link between energy security and U.S. prosperity stems from the alliances the U.S. creates specifically for energy interests. Conflicts may not be over energy but energy may be the reason the U.S. is drawn into an alliance and thus into conflict. An example of this would be bringing Georgia into NATO. The claim for NATO expansion to Georgia is energy interests, though this may be an opportunistic rationale since there’s no strategic or inherent reason for the relationship. However, if a Georgia-Russia conflict were to occur, it would not stem over oil but still might cause NATO to intervene to honor its commitments. Though this may not be likely, it is a real possibility. In other words, if this became a threat to US national security or involved it in conflict, it would be because of initial energy considerations. 4. There is a potential mechanism linking national security to energy security through the relationship between U.S. energy needs and terrorism. The U.S. need for energy leads it into Middle Eastern involvement, particularly in Saudi Arabia, and in conflicts like the Gulf war, which does generate some energy for al Qaeda in opposing the U.S. forward bases present largely based on energy. There is a case to be made that less involvement in the Middle East results in al-Qaeda having less interest in us. Anti-Americanism and terrorism may stem out of such energy interests, but it is still possible to assess that, even accepting this, al-Qaeda may not pose much of a danger. II. The second set of mechanisms deals with the influence of other states’ energy dependence on U.S. national security. 5. Alliances entering energy conflicts -- Alliances, forged out of non-energy motives, could get entangled in conflicts over energy that would require the U.S. coming to the defense of their allies. This possibility exists if China and Japan to get into conflict over energy resources in the East China Sea. If this conflict occurs, the U.S. would get drawn into that conflict potentially resulting in major power conflict. This conflict over the maritime boundary was much less intensive before it was discovered that oil and gas may be present. Thus the role of energy and increasing value intensifies competition and the claims over boundaries and islands. 6. Security dilemma mechanism – A country with a resource dependence that seeks to protect it with military power (e.g. China) may end up challenging other states’ and/or U.S. naval capabilities. This could spark competition and though it does not lead to war itself, it could strain political relations and drive a military expansion, making war more likely. As a result, China’s dependence on oil offers potential leverage as well as a source of danger for the United States. 7. Energy dependence reduces U.S. foreign policy leverage - If other great powers are major importers of oil, the U.S. is less able to pressure those oil-exporting countries. The U.S. has a hard time getting China to impose sanctions on Iran due to proliferation because of China’s imports from and investments in Iran. Nuclear proliferation is generally bad for security, particularly with Iran, and there is a belief that energy interests/relations inhibit our ability to crack down on this, thus resulting in a security problem. In broad terms it undercuts our leverage. A similar pattern has emerged with Russian economic interests in Iran with regards to nuclear reactor sales. The China Scenario (mechanism #6) is a relatively new situation: China is a relatively new importer of oil -- it was an exporter until about 15 yrs ago. This will continue to grow in the next few decades no matter what. China’s oil imports are vulnerable to the U.S. navy because much of its oil comes from the Persian Gulf and it has no military ability between the Persian Gulf and Strait of Malacca. It is not a fluke that the U.S. controls the seas, but we have security and energy interests (and regional commitments) to make sure Japan and South Korea are supplied with oil. However, both countries cannot control the SLOCs since it’s a shared space that needs to be controlled. Any country that vulnerable would be concerned, but China is specifically worried about a conflict over Taiwan where the U.S. can coerce China by threatening access to the sea lanes and oil. To fight to protect Taiwan, China also needs a navy that can protect its maritime access and this is a multi-decade project. The U.S. is already concerned about the growth of the Chinese navy. This itself may not lead to conflict but it will be one of the many things that can poison the U.S.-China relationship. The damage from this vulnerability will strain relations to make the crisis more likely (over Taiwan) and may escalate early. This is not simply resource wars but where energy is playing a role in the background that may make conflict more likely. A Variant of Mechanism #2 Another potential example is Iran seeking to inhibit the U.S. ability to access Gulf oil for prosperity reasons. The case of Iran gets more interesting if/when it acquires nuclear weapons. Based on analysis by Caitlin Talmadge, if Iran were to close the Strait of Hormuz, we could open it, but to open the strait, we would need to get involved in fairly extensive conventional operations on land and sea that could escalate. Iran wouldn’t think of using nuclear weapons to close the strait but the U.S. operations to open the strait could escalate rapidly causing their use to be more thinkable at later stages. Iran is more likely to retaliate against U.S. coercion if/when it has nuclear weapons. Most of its current threats are undermined by a lack of a deterrent but it becomes less vulnerable to coercion if it if it acquires nuclear weapons and it could use them in a bargaining manner. Moreover, the most likely danger is that the targets the U.S. is attacking to re-open the straits are land targets and command and control nodes that, as Posen details, could lead to inadvertent escalation. Broader points/takeaways It is not clear that U.S. insecurity has increased in the past two decades, but if it has, energy security is less a problem for the reasons people often point to (like high energy prices) and more likely a problem for reasons like instability in the Gulf. The scenarios with China and nuclear Iran are newer problems and these dangers do not arise out of standard resource war arguments. It is also possible that energy self-sufficiency may abate some of the dangers. Energy dependence may be replacing the value of territory and the terrain of energy transport is becoming more like territory, which invokes a more traditional set of mechanisms for conflict.

### Advantage 3

Is spent fuel

#### Utilities currently store waste in interim storage on site – no reprocessing forces this option.

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This tragic event is casting a spotlight on the spent fuel pools at U.S. nuclear reactors, which store some of the largest concentrations of radioactivity on the planet. For nearly 30 years, Nuclear Regula-tory Commission waste-storage requirements have been contingent on the timely opening of a permanent waste repository. This has allowed plant operators to legally store spent fuel in onsite cooling pools much longer, and at higher densities (on average four times higher), than was originally intended. Spent fuel pools were designed to be temporary and to store only a small fraction of what they currently hold. “Neither the AEC [Atomic Energy Com-mission, now the Energy Department] nor utilities anticipated the need to store large amounts of spent fuel at operating sites,” said a report by Dominion Power, the owner of the Millstone nuclear reactor in Waterford, Connecticut in October 2001. “Large-scale commercial reprocessing never materialized in the United States. As a result, operating nuclear sites were required to cope with ever-increasing amounts of irradiated fuel... This has become a fact of life for nuclear power stations.

#### U.S. spent fuel pools are a unique risk for mass radiation leaks due to poor protection.

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Nearly 40 percent of the radioactivity in U.S. spent fuel is cesium-137 (4.5 billion curies) — roughly 20 times more than released from all atmospheric nuclear weapons tests. U.S. spent pools hold about15-30 times more cesium-137 than the Chernobyl ac-cident released. For instance, the pool at the Vermont Yankee reactor, a BWR Mark I, currently holds nearly three times the amount of spent fuel stored at Dai-Ichi's crippled Unit 4 reactor. The Vermont Yankee reactor also holds about seven percent more radioactivity than the combined total in the pools at the four troubled reactors at the Fukushima site. Even though they contain some of the larg-est concentrations of radioactivity on the planet, U.S. spent nuclear fuel pools are mostly contained in ordi-nary industrial structures designed to merely protect them against the elements. Some are made from ma-terials commonly used to house big-box stores and car dealerships. The United States has 31 boiling water reactors (BWR) with pools elevated several stories above ground, similar to those at the Fukushima Dai-Ichi station. Asin Japan, all spent fuel pools at nuclear power plants do not have steel-lined, concrete barriers that cover reactor vessels to prevent the escape of radioactivity. They are not required to have back-up generators to keep used fuel rods cool, if off site power is lost. The 69 Pressurized Water (PWR) reactors operating in the U.S. do not have elevated pools, and also lack proper containment and several have large cavities beneath them which could exacerbate leakage.

#### Accident is likely now - the majority of U.S. spent fuel pools are in earthquake zones.

Robert Alvarez, May 2011, is a Senior Scholar at IPS, where he is currently focused on nuclear disarmament, environmental, and energy policies, former secretary in the DOE, “Spent Nuclear Fuel Pools in the U.S.: Reducing the Deadly Risks of Storage”, Institute for Policy Studies, <http://www.scribd.com/doc/95322584/Spent-Nuclear-FuelPools-in-the-U-S-Reducing-the-Deadly-Risks-of-Storage>

There are 104 U.S. commercial nuclear reactors operating at 64 sites in 31 states that are holding some of the largest concentrations of radioactivity on the planet in onsite spent fuel pools. The pools, typically rectangular or L-shaped basins about 40to 50 feet deep, are made of reinforced concrete walls four to five feet thick and stainless steel liners. Basins without steel liners are more susceptible to cracks and corrosion. Most of the spent fuel ponds at boiling water reactors are housed in reactor buildings several stories above ground. Pools at pressurized water reactors are partially or fully embedded in the ground, sometimes above tunnels or underground rooms. According to estimates provided by the Department of Energy, as of this year this spent fuel contains a total of approximately 12 billion curies of long-lived radioactivity (Table 1).6 Of the 65,000 metric tons estimated by the Nuclear Energy Institute to be generated by the end of 2010, 75 percent is in pools, while the remainder is in dry storage casks. Several of these reactors are located in earthquake zones (Figure 5).

#### No time to contain a U.S. waste spill due to an earthquake.

Tony Dutzik, 3-17-2011, is senior policy analyst, “What Are the Risks Posed by Spent Fuel Pools in the United States?,” Frontier Group, http://www.frontiergroup.org/blogs/blog/fg/what-are-risks-posed-spent-fuel-pools-united-states

The risks of radiation releases from the loss of coolant from spent fuel pools are quite real. Indeed, the occurrence of an earthquake that exceeds the design basis of the nuclear plant has been identified as one of the most probable causes of a loss-of-coolant accident involving spent fuel. In 2006, the U.S. National Research Council issued a detailed report on the risk posed by a terrorist attack on spent fuel pools at nuclear reactors. Among the authors’ conclusions were that “under some conditions, a terrorist attack that partially or completely drained a spent fuel pool could lead to a propagating zirconium cladding fire and the release of large quantities of radioactive materials to the environment.” The report also cited a 2001 Nuclear Regulatory Commission study, summarizing it as follows: “The analysis suggested that large earthquakes and drops of fuel casks from an overhead crane during transfer operations were the two event initiators that could lead to a loss-of-pool-coolant accident. For cases where active cooling (but not the coolant) has been lost, the thermal-hydraulic analyses suggested that operators would have about 100 hours (more than four days) to act before the fuel was uncovered sufficiently through boiling of cooling water in the pool to allow the fuel rods to ignite. This time was characterized as an 'underestimate' given the simplifications assumed for the loss-of-pool-coolant scenario.”

#### PRISMs utilize spent fuel pools as catalysts for energy - eliminates waste.

W.H. Hannum et. al, 2010, has been a senior official with the Department of Energy, H.F. McFarlane earned his Ph.D. in engineering science at California Institute of Technology, is currently associate director of the Technology Development Division at Argonne National Laboratory, D.C. Wade is a Senior Technical Advisor, Distinguished Fellow Engineer Nuclear Engineering Division Argonne National Laboratory, R.N. Hill is the Technical Director at Argonne National Laboratory, Nuclear Energy R&D Nuclear Engineering Division, “The Benefits of an Advanced Fast Reactor Fuel Cycle for Plutonium Management,” p. 18, <http://www.osti.gov/bridge/servlets/purl/459313-d9NYz8/webviewable/>

Plutonium is a fact. World inventories currently exceed 1000 tonnes, and are increasing at 60 to 80 tonnes per year. This can be considered a valuable energy resource or a political and environmental burden, The best approach is that which will maximize the benefits and minimize the burden. A closed fast reactor he1 cycle using an advanced recycle technology provides such an option by using plutonium as a catalyst to extract the full energy content from the world’s uranium reserves, while eliminating excess inventories of plutonium and of other long lived transuranic byproducts. Such a system is fully compatible with rigorous safeguards, and in fact presents few safeguard challenges beyond those which are associated with the once-thorough fuel cycle. The most important long-term contribution of the fast reactor approach to safeguards and prevention of proliferation is that it provides a positive means of managing the overall size of the world’s plutonium and transuranic inventory (Ref. 30). With a kel cycle management strategy driven by economics, the fast reactor can readily absorb excess plutonium stocks, leaving the world inventory sequestered in plants producing useful energy.

#### Existing reprocessing tech is not safe – sheer volume of solutes guarantees critical mass accidents resulting in deadly fallout worsening waste.

Stephen Berry & George S. Tolley, 11-29-2010, James Franck Distinguished Service Professor Emeritus at the University of Chicago, Fellow, American Academy of Arts and Sciences, foreign Member, Royal Danish Academy of Sciences, member and Home Secretary, National Academy of Sciences, J. Heyrovsky Honorary Medal for Merit in the Chemical Sciences, Academy of Sciences of the Czech Republic, Alexander von Humboldt-Stiftung Senior Scientist Award, Phi Beta Kappa National Lecturer, George S. Tolley is a professor emeritus in Economics at the University of Chicago, fellow, American Association for the Advancement of Science, honorary editor, Resource and Energy Economics, honorary Ph.D., North Carolina State University, “Nuclear Fuel Reprocessing Future Prospects and Viability,” p. 6, <http://humanities.uchicago.edu/orgs/institute/bigproblems/Team7-1210.pdf>

Although PUREX is a well-documented and widely used process today, it is far from perfect. Ideally, reprocessing should aim to reduce the radioactivity of waste. While PUREX accomplishes this in some regard, due to the sheer volume of solutes used the result is a much larger quantity of less radioactive waste. Another important concern is that with any buildup of uranium or plutonium there is a possibility of critical mass being attained. Although a chain reaction resulting from such a small amount of lowly enriched material would not be devastating, it could result in direct exposure of workers to high energy gamma and neutron radiation, minor concern for fallout of material into the environment, and decommissioning of the plant. The most recent example of such an accident was in 1999 at the Tokaimura reprocessing plant in Japan. The U-235 criticality achieved was a result of improperly trained workers circumventing standard mixing protocol to expedite the process. Two of the three workers responsible died from receiving a full body radiation dose ~10000 mSv (millisievert). Other workers in the plant as well as people in the surrounding area received radiation doses as well, but none of these exceeded ~50 mSv the average lethal dose being 8000 mSv.5 One could argue that such an accident would never occur if the facility was operated according to standard regulations, but the ability to ensure such fastidious observation of the rules in all workers is debatable.

#### Massive ionizing radiation release makes extinction inevitable.

Rosalie Bertell, 2000, American physician and epidemiologist and winner of several awards, including the Hans-Adalbert-Schweigart-Medal (1983), Right Livelihood Award (1986) World Federalist Peace Award, Ontario Premier's Council on Health, Health Innovator Award, the United Nations Environment Programme Global 500 award, and the Sean MacBride International Peace Prize, “Part One: The Problem: Nuclear Radiation and its Biological Effects,” No Immediate Danger, Prognosis for a Radioactive Earth, The Book Publishing Company, <http://www.ratical.org/radiation/NRBE/NRBE9.html>

In 1964 Hermann Müller published a paper, `Radiation and Heredity', spelling out clearly the implications of his research for genetic effects (damage to offspring) of ionizing radiation on the human species. [17] The paper, though accepted in medical/biological circles, appears not to have affected policy makers in the political or military circles who normally undertake their own critiques of published research. Müller predicted the gradual reduction of the survival ability of the human species as several generations were damaged through exposure to ionizing radiation. This problem of genetic damage continues to be mentioned in official radiation-health documents under the heading `mild mutations'[18] but these mutations are not `counted' as health effects when standards are set or predictions of health effects of exposure to radiation are made. There is a difficulty in distinguishing mutations caused artificially by radiation from nuclear activities from those which occur naturally from earth or cosmic radiation. A mild mutation may express itself in humans as an allergy, asthma, juvenile diabetes, hypertension, arthritis, high blood cholesterol level, slight muscular or bone defects, or other genetic `mistakes'. These defects in genetic make-up leave the individual slightly less able to cope with ordinary stresses and hazards in the environment. Increasing the number of such genetic `mistakes' in a family line, each passed on to the next generation, while at the same time increasing the stresses and hazards in the environment, leads to termination of the family line through eventual infertility and/or death prior to reproductive age. On a large scale, such a process leads to selective genocide of families or species suicide.

#### Environmental impact of a nuclear war.

Leah Ayala, Winter 2003, “Nuclear Power Companies the Department of Energy: A Legal Remedy Magnifying Nuclear Ends,” Nevada Law Journal, Lexis Nexis

A very small amount of nuclear waste can be disastrous. If an amount of plutonium about the same size as a beach ball was properly dispersed, it could cause lung cancer in everyone on earth. R. Routley & V. Routley, Nuclear Energy and Obligations to the Future, 21 INQUIRY 133, 136 (1978). See generally Robin Dusek, Lost in Space?: The Legal Feasibility of Nuclear Waste Disposal in Outer Space, 22 WM. & MARY ENVTL. L. & POL'Y REV. 181 (1997). Some estimate that a large release of nuclear waste from Yucca Mountain, which has a capacity to hold 77,000 metric tons of waste, would exceed the environmental impact of a nuclear war. This is a huge amount of waste compared to the "few dozen pounds" of waste released in the Chernobyl explosion that is estimated will result in between 17,000 to 475,000 human deaths from cancer. Broad, supra note 132. Each of the spent fuel assemblies that will be stored in the repository contains a similar amount of radioactivity as ten Hiroshima bombs. Lazarus, supra note 1 (citing Klaus Schumann, a Green Party activist and member of the San Luis Obispo County Nuclear Waste Management Committee).

### 1AC solvency

#### Loan guarantees are key to establishing PRISM reactors.

Stephen Berry & George S. Tolley, 11-29-2010, James Franck Distinguished Service Professor Emeritus at the University of Chicago, Fellow, American Academy of Arts and Sciences, foreign Member, Royal Danish Academy of Sciences, member and Home Secretary, National Academy of Sciences, J. Heyrovsky Honorary Medal for Merit in the Chemical Sciences, Academy of Sciences of the Czech Republic, Alexander von Humboldt-Stiftung Senior Scientist Award, Phi Beta Kappa National Lecturer, George S. Tolley is a professor emeritus in Economics at the University of Chicago, fellow, American Association for the Advancement of Science, honorary editor, Resource and Energy Economics, honorary Ph.D., North Carolina State University, “Nuclear Fuel Reprocessing Future Prospects and Viability,” p. 38, <http://humanities.uchicago.edu/orgs/institute/bigproblems/Team7-1210.pdf>

The construction of an aqueous solvent extraction plant would be out of date, especially when the more promising option of pyroprocessing is on the horizon. In comparison, to current available methods, pyroprocessing produces virtually no waste, can be done on-site, and offers the option of fabricating proliferation resistant fuel from plutonium as well as uranium. The second question in regard to domestic reprocessing is, “how much direct involvement should the government have in the reprocessing business?” Government involvement could be justified on the grounds of the externalities present in nuclear waste disposal. This could take on a variety of forms - government research efforts, subsidizing reprocessing (or offering tax credits and loan guarantees), or even operating a reprocessing center on its own. Through its actions, the government will be able to influence the development and growth of the nuclear reprocessing industry in the United States. These efforts in support of pyroprocessing and other advanced fuel cycle technologies represent a small portion of the Department of Energy budget - only $142,652,000 out of a total of $33,856,453,000 in discretionary funding in FY 2009, or less than half of one percent98. Furthermore, private companies do not have sufficient independent incentives to reduce the long-term health and environmental consequences of nuclear waste disposal. While it is beyond the scope of this paper to present a formal costbenefit analysis of R&D efforts, given the minimal costs and the large potential benefits, the chances of success do not need to be very high to justify continued government expenditures in this area.

#### PRISM’s are at low cost and have expedited construction because of a pre-licensed design – solves emission problems.

Magdi Ragheb, 3-9-2012, Ph.D., Nuclear Engineering/Computer Sciences, Univ. of Wisconsin, Associate Professor, Interdisciplinary Research Center, National Center for Supercomputing Applications (NCSA), Univ. of Illinois at Urbana-Champaign, Fusion Research Program, Univ. of Wisconsin, Department of Nuclear Engineering, Brookhaven National Laboratory, “RESTARTING THE STALLED USA NUCLEAR RENAISSANCE,” <https://netfiles.uiuc.edu/mragheb/www/NPRE%20402%20ME%20405%20Nuclear%20Power%20Engineering/Restarting%20the%20USA%20Stalled%20Nuclear%20Renaissance.pdf>

GE Hitachi Nuclear Energy, GEH next evolution of the Na cooled reactor technology is the Power Reactor Innovative Small Modular, PRISM reactor concept. The use of Na as a coolant allows for a fast neutrons spectrum in the core allowing breeding; hence a long time between refuellings. In addition, the hard neutron spectrum fissions the transuranic elements produced in the U-Pu fuel cycle, converting them into shorter lived fission products. This produces useful energy as well as reduces the volume and complexity of the U-Pu cycle waste disposal problem. The concept can also be used for consuming the transuranics in used nuclear fuel from water cooled reactors. Sodium-cooled reactors enjoy a safety aspect of operating at low pressure compared with light water cooled reactors. The PRISM reactor employs passive safety design features. Its simple design, allows factory fabrication with modular construction and ultimately lower costs. Passive core cooling is used enhancing the reactor’s safety. The residual or decay heat is passively released to the atmosphere with the elimination of active safety systems. Electromagnetic pumps without moving parts are used, eliminating valves and motors used in other nuclear island designs. The standardized modular design allows for an expedited construction schedule due to pre-licensed design, and factory fabrication. PRISM has a reference construction schedule of 36 months. A single PRISM power block generating 622 MWe the same amount of electricity generated in the USA through conventional sources would reduce greenhouse gas emissions by an amount equivalent to taking 700,000 cars off the road while at the same time offering the possibility of acting as an actinides burner consuming LWRs used nuclear fuel.

#### PRISM could be developed in five years – other reprocessing alternatives create worse waste problems.

Fred Pearce, 8-8-2012, is a freelance author and journalist based in the UK, he serves as environmental consultant for New Scientist magazine and is the author of numerous books, including When The Rivers Run Dry and With Speed and Violence, in previous articles for Yale Environment 360, environment 360, Breakthrough Institute, “Nuclear Fast Reactor: The Saviour of Nuclear Power?,” <http://oilprice.com/Alternative-Energy/Nuclear-Power/Nuclear-Fast-Reactor-The-Saviour-of-Nuclear-Power.html>

The PRISM fast reactor is attracting friends among environmentalists formerly opposed to nuclear power. They include leading thinkers such as Stewart Brand and British columnist George Monbiot. And, despite the cold shoulder from the Obama administration, some U.S. government officials seem quietly keen to help the British experiment get under way. They have approved the export of the PRISM technology to Britain and the release of secret technical information from the old research program. And the U.S. Export-Import Bank is reportedly ready to provide financing. Britain has not made up its mind yet, however. Having decided to try and re-use its stockpile of plutonium dioxide, its Nuclear Decommissioning Authority has embarked on a study to determine which re-use option to support. There is no firm date, but the decision, which will require government approval, should be reached within two years. Apart from a fast-breeder reactor, the main alternative is to blend the plutonium with other fuel to create a mixed-oxide fuel (mox) that will burn in conventional nuclear power plants. Britain has a history of embarrassing failures with mox, including the closure last year of a $2 billion blending plant that spent 10 years producing a scant amount of fuel. And critics say that, even if it works properly, mox fuel is an expensive way of generating not much energy, while leaving most of the plutonium intact, albeit in a less dangerous form. Only fast reactors can consume the plutonium. Many think that will ultimately be the UK choice. If so, the PRISM plant would take five years to license, five years to build, and could destroy probably the world's most dangerous stockpile of plutonium by the end of the 2020s. GEH has not publicly put a cost on building the plant, but it says it will foot the bill, with Proponents of fast reactors see them as the nuclear application of one of the totems of environmentalism: recycling. the British government only paying by results, as the plutonium is destroyed. The idea of fast breeders as the ultimate goal of nuclear power engineering goes back to the 1950s, when experts predicted that fast-breeders would generate all Britain's electricity by the 1970s. But the Clinton administration eventually shut down the U.S.'s research program in 1994. Britain followed soon after, shutting its Dounreay fast-breeder reactor on the north coast of Scotland in 1995. Other countries have continued with fast-breeder research programs, including France, China, Japan, India, South Korea, and Russia, which has been running a plant at Sverdlovsk for 32 years.

#### It’s the only reactor that is ready for commercial deployment – comparatively better to meet all necessary goals.

Barry Brook & Tom Blees, 10-23-2012, a leading environmental scientist, holding the Sir Hubert Wilkins Chair of Climate Change at the School of Earth and Environmental Sciences, and is also Director of Climate Science at the University of Adelaide’s Environment Institute, published three books, over 200 refereed scientific papers, is a highly cited researcher, received a number of distinguished awards for his research excellence including the Australian Academy of Science Fenner Medal, is an International Award Committee member for the Global Energy Prize, Australian Research Council Future Fellow, ISI Researcher, Ph.D., Macquarie University in Environmental Engineering, Science Council for Global Initiatives, Edgeworth David Medal Royal Society of NSW, Cosmos Bright Sparks Award, Tom Blees is the author of Prescription for the Planet, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, BraveNewClimate, “The Case for Near-term Commercial Demonstration of the Integral Fast Reactor,” <http://bravenewclimate.com/2012/10/23/the-case-for-near-term-commercial-demonstration-of-the-integral-fast-reactor/>

The conferees also touched on other fast reactor and thermal reactor systems being considered today, in varying degrees of development: molten fluoride salt thorium reactors (LFTRs), liquid-salt-cooled pebble fuel systems, etc. [16] While some of these hold promise, none are near the level of readiness for near-term commercial-prototype deployment as the PRISM reactor and its metal-fuel technology. In addition, none of the immediate prospects can match the IFR concept in meeting all the goals of the Gen IV initiative.

#### Peak energy will happen with our current energy system in the status-quo and the result is extinction – the only sustainable solution is the new PRISM reactor.

Charles E. Till & Yoon Il Chang, 2011, longtime Associate Laboratory Director for Engineering Research at Argonne National Laboratory, directed civilian nuclear power reactor development at Argonne National Laboratory, PhD Engineering, Specialty Reactor Physics, Imperial College, University of London, National Research Council of Canada, United Kingdom Atomic Energy Authority , Fellow of the American Nuclear Society, awarded the Walker Cisler Medal, National Academy of Engineering, was at Argonne National Laboratory, General Manager of the Integral Fast Reactor Program, Associate Laboratory Director for Engineering Research, Interim Laboratory Director, Argonne Distinguished Fellow, Currently he also serves as the Chair of IAEA’s Technical Working Group on Nuclear Fuel Cycle Options and Spent Fuel Management, was awarded the U.S. Department of Energy’s prestigious E.O. Lawrence Award, a Fellow and a recipient of the Walker Cisler Medal of American Nuclear Society, M.E. in Nuclear Engineering from Texas A&M University, and his Ph.D. in Nuclear Science from The University of Michigan, Science Council for Global Initiatives (SCGI), Plentiful Energy: The Story of the Integral Fast Reactor, p. 82, Amazon.com

All in all, carbon and hydrocarbon availability will also certainly peak and diminish in the next twenty-five years or so. Populations and energy demand will, on the other hand, continue to increase, exponentially if the past is a guide. All the “alternative energy” sources, as defined by environmental groups, with some possible but limited exception in bio-fuels, will come to nothing on the scale of energy replacement required. Physical limitations guarantee this. Nuclear energy has no such physical limitations. Its predicted role, however, remains marginal in all accepted mainstream predictions of future energy supplies. Again, the reasons are obvious, and directly attributable to the successful anti-nuclear campaigns of organized environmental groups. The only result of this path, unaltered, is increasing shortage of energy—life-changing draconian. A perusal of the current literature will demonstrate that this kind of future is looked upon with equanimity, even with enthusiasm, by those who push “alternative energies.” It is a utopian recipe for global disaster. And it will not happen. Civilizations, nations, will do their best to maintain their energy supplies and do whatever is necessary. The most realistic, and peaceful, avenue is plentiful electricity supplied by nuclear power. It will not substitute directly for all other forms of energy. But it will provide limitless electrical power. Electricity is very adaptable, and if you have it abundantly a lot of substitution can be done. A great deal of nuclear capacity will be required. Military might is not required. Attention is. Comfortable views of nuclear power as a small element of the global energy picture are common enough. The recent report, “Nuclear Power Joint Fact-Finding” by the Keystone Center [5], is an excellent example of this. In essence, they extrapolate the situation today, where nuclear energy is a useful but small contributor to U.S. energy overall, and surveying the present state of the nuclear industry in the U.S., conclude that there will be difficulty in maintaining even this. There is no evidence of any alarm at this. The important, the all-important point, is evaded completely: the carbon-based energy system that we have relied upon completely for our nation’s well-being is now endangered. This is not to happen far out in the future; masked somewhat by the recession, it is happening now. Real additions of large magnitude to energy supplies are absolutely essential. The alternative is conflict—military action, if history is any guide, as nations fight for energy resources; or pushed further, some scenario of the doomsayers whose theme is the inevitability of the collapse of civilization. The situation is serious, and it is made more serious by the fact that it is not generally recognized as such and little of use is being done. And if nuclear power is to fill the role that must be assigned to it, the IFR or something very similar is needed.

#### No risk of accidents – chemical benefits and engineering experience.

Barry Brook & Tom Blees, 10-23-2012, a leading environmental scientist, holding the Sir Hubert Wilkins Chair of Climate Change at the School of Earth and Environmental Sciences, and is also Director of Climate Science at the University of Adelaide’s Environment Institute, published three books, over 200 refereed scientific papers, is a highly cited researcher, received a number of distinguished awards for his research excellence including the Australian Academy of Science Fenner Medal, is an International Award Committee member for the Global Energy Prize, Australian Research Council Future Fellow, ISI Researcher, Ph.D., Macquarie University in Environmental Engineering, Science Council for Global Initiatives, Edgeworth David Medal Royal Society of NSW, Cosmos Bright Sparks Award, Tom Blees is the author of Prescription for the Planet, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, BraveNewClimate, “The Case for Near-term Commercial Demonstration of the Integral Fast Reactor,” <http://bravenewclimate.com/2012/10/23/the-case-for-near-term-commercial-demonstration-of-the-integral-fast-reactor/>

One of the issues most often mentioned when discussing sodium-cooled fast reactors—by far the type with the most reactor-years of experience worldwide—is the chemical reactivity of sodium, which burns upon contact with air (though with a very cool flame) and reacts quite dramatically upon contact with water. Yet sodium has several compelling advantages in fast-reactor operation: superior heat-exchange properties, virtually no corrosive effect on reactor components even after decades of operation, short half-life of sodium isotopes that form in the reactor vessel, etc. (see previous section). Some advocates of other systems characterize sodium’s volatility as a deal-breaker. But the intermediate loop that transfers heat from the reactor vessel to the steam generator contains only non-radioactive sodium, with the steam generator isolated in a separate structure, assuring that in the highly unlikely event of a sodium-water reaction there will be no danger to the primary system and no chance of radioactive material being involved. This design means that the unfairly characterized sodium problem is nothing more than an engineering design issue, involving a common element that has been used in industrial processes for well over a century. With over 300 reactor-years of experience with sodium-cooled fast reactors around the world, not a single instance of sodium-water interaction resulting in radioactive release has been recorded [15].

# 2AC

## Solvency

### A2 too slow to solve/too new

#### Pyroprocessing has been extensively researched and developed now – all we need is commercial investment.

Michael F. Simpson & Jack D. Law, February 2010, Princeton University with a Ph.D. in chemical engineering, currently a member of the research staff at INL, previously, he served as the manager of the Advanced Safeguards department, worked extensively with researchers and leaders from Korea Atomic Energy Research Institute, is a technical advisor to both Departments of State and Energy, PhD. MIT with an emphasis in chemical engineering, professor emeritus at the Vanderbilt University School of Engineering Department of Civil and Environmental Engineering, works at the INL, Idaho National Laboratory, “Nuclear Fuel Reprocessing,” p. 19, <http://www.inl.gov/technicalpublications/Documents/4460757.pdf>

Pyroprocessing utilizes molten salt electrolytes as the media rather than acidic aqueous solutions and organic solvents42. These electrolytes are principally used to support electrochemical separations such as uranium electrorefining and electrolytic reduction of oxide fuel. The process includes vacuum furnaces that accomplish salt/metal separations and melt metal deposits into ingots for either waste disposal or fuel fabrication. Ceramic and metal waste streams are generated that immobilize fission products and, optionally, plutonium and minor actinides into high level waste forms. For eventual commercial implementation, it is expected that plutonium and minor actinides will be recycled and used for fast reactor fuel fabrication. While this technology has yet to reach the commercialization stage, it has been the subject of extensive, government funded research and development worldwide in addition to the EBR II spent fuel treatment work in the U.S. For example, the Republic of Korea is currently pursuing a strategy of developing pyroprocessing technology for treatment of spent fuel from their commercial light water reactors to minimize volume of high level waste and possibly extract fissile actinides for eventual fabrication of fast reactor fuel43 44. Russia has already demonstrated production of MOX based on pyroprocessing and plans to develop a closed fuel cycle using the technology by 2020.

## Russian insecurity

### 2AC no Russian scientists

#### We get the scientsits on board.

Jacques C. Hymans, January/March 2011, is associate professor of international relations at the University of Southern California, research focuses on nuclear proliferation, and more broadly, on international security affairs, an editorial board member of the Nonproliferation Review, Ph.D. in Government from Harvard University,Postdoctoral Fellow, Harvard University Olin Institute for Strategic Studies, Vol. 20 Issue 1, “Proliferation Implications of Civil Nuclear Cooperation: Theory and a Case Study of Tito's Yugoslavia,” p. 100-3, Ebsco Host

Many analysts have characterized aboveboard international civil nuclear cooperation—“Atoms for Peace”—as an unmitigated disaster for the cause of nonproliferation. Most of Atoms for Peace’s dwindling band of supporters themselves no longer contest the idea that it has given dozens of developing countries the technical capacity to build nuclear weapons at a time of their 114 Note that despite Tito’s 1974 decision, Gaukhar Mukhatzhanova finds that Solingen’s argument about the impact of liberalizing political coalition interests on regimes’ nuclear intentions generally fits the Yugoslav case pretty well. See Mukhatzhanova, “Nuclear Weapons in the Balkans,” esp. 213–15. choosing. Even such routine practices as the holding of international confer-ences and student exchange programs in the fields of nuclear science and engineering have come under fire. In contrast to these general trends in the literature, this article has offered a more nuanced assessment of the effects of Atoms for Peace. The literature needs to abandon its outdated, oversimplified, techno-centric approach to the supply side of the proliferation equation. When we recognize that “tech-nical” capacity has political foundations, the effects of Atoms for Peace on states’ nuclear weapons capacity appear much different than the literature suggests. In particular, by changing the career opportunities available to the most talented and energetic among the small pool of competent scientific workers in developing country contexts, Atoms for Peace makes their choice for loyalty more complicated, their choice for voice less dangerous, and their choice for exit more feasible. Thus, Atoms for Peace can substantially retard or even reverse the growth of technical capacity to build the bomb, despite the transfer of hardware and know-how that it promotes. The case study of Yugoslavia has substantiated the theorized nonproliferation-promoting effects of Atoms for Peace, even during the pol-icy’s most “na¨ıve” nuclear promotion days of the 1950s and 1960s. As Yu-goslavia represents a hard test for the theory presented here, the findings from this study should be given special heed. We should not be surprised that Atoms for Peace ended up undercutting the Tito regime’s nuclear ambi-tions through such mechanisms as brain drain, since similar findings abound in the broader literature on international technology transfer, with which the proliferation literature needs to engage deeply. This article is not claiming that Atoms for Peace was a silver bullet for nonproliferation in the case of Yugoslavia. Rather, the claim is that over the long run Atoms for Peace intensified and locked in the Yugoslav nuclear program’s poor organizational performance, and accelerated the program’s ultimate collapse. Some readers might be tempted to conclude that since poor organization and management were the root causes of Yugoslavia’s nuclear woes, therefore the effects of Atoms for Peace were superfluous to the outcome. However, it would be wrong to ignore the Atoms for Peace variable simply because it did not singlehandedly prevent a Yugoslav nuclear bomb from coming into being. Recall that up until now, the literature has generally contended that Atoms for Peace helps states leapfrog over their or-ganizational and resource limitations by handing them ready-made solutions to difficult technical problems. So it would already be a significant finding simply to show that Atoms for Peace, even in its heyday in the 1950s and 1960s, actually did not allow them to leapfrog those limitations. But in fact my finding is that Atoms for Peace greatly compounded those limitations, at least in the case of Yugoslavia. My finding turns standard thinking about this question on its head. This finding is not just interestingly counterintu-itive; it also has important implications for United States and international nonproliferation policy. Typical nonproliferation measures, such as export controls and technical safeguards, can hope to achieve little more than to re-strain nuclear programs from moving forward; but I have shown that Atoms for Peace, especially by stimulating the brain drain, ultimately caused the Yu-goslav nuclear program to stumble backward, and made it next to impossible for Belgrade to turn things around. I should also underscore that this article is not claiming that Yugoslavia’s experience with Atoms for Peace necessarily generalizes to every developing country. Some developing countries have been able to leverage civil nuclear cooperation to achieve nuclear weapons more quickly than they otherwise could have. India is often mentioned as a prime example of the danger that Atoms for Peace will unwittingly provide atoms for war. But this article’s focus on Yugoslavia represents a necessary corrective to the literature’s typ-ical focus on proliferation headline-makers like India. Moreover, there are good theoretical reasons to think that the Yugoslav nuclear experience with Atoms for Peace may have been much more typical for developing countries than the Indian experience. First, as noted earlier in the article, the brain drain literature has singled out India as one of the handful of developing countries where the size and quality of the science and technology com-munity are enough to allow it to absorb the hit of a substantial brain drain and yet still benefit through such compensating mechanisms as brain circu-lation, brain diaspora, and brain replacement. 121 Second, the literature on state capacity suggests that the bureaucratic “steel frame” inherited from the British colonial Indian Civil Service, though surely not problem-free, places India far above most other developing countries in terms of its level of state institutionalization. 122 Reflecting these general bureaucratic strengths of the Indian state, the Indian nuclear program was—despite some hiccups—quite well-organized and managed, and this substantially reduced the potential for India’s participation in Atoms for Peace to cause it serious damage. 123 In short, India appears deductively to be a much more exceptional case in the developing world than Yugoslavia, although more in-depth case studies will be necessary before we can say for sure if Yugoslavia’s experience with Atoms for Peace was truly typical or not. 124 121 An anonymous reviewer of this article suggested that we should consider whether, contrary to the general presumption of the proliferation literature, proliferant states often pare back their international civil nuclear cooperation efforts in order to avoid creating complications for their nuclear weapons Proliferation Implications of Civil Nuclear Cooperation 103 It might be that even if Yugoslavia’s experience was typical for its time period, a reenergized Atoms for Peace policy would not have the same nonproliferation-promoting consequences in today’s changed circumstances. But it is also possible to argue that an expanded commitment to overt interna-tional civil nuclear cooperation would have even stronger nonproliferation-promoting consequences in today’s world. After all, the brain drain from the developing world (and post-Communist states) continues to be a major social fact in the contemporary international system. Although the United States demand for the services of developing-world scientists and engineers was already quite high during the 1950s and 1960s, it has become absolutely voracious in recent years. Between 1978 and 2008, the number of U.S. PhD recipients holding temporary visas jumped from 3,475 (11 percent of the total number of doctorates granted by American universities) to 15,246 (31 percent of the total). In the physical sciences, the increase was from 653 (16 percent) to 3,678 (45 percent). In engineering, the increase was from 781 (32 percent) to 4,486 (57 percent). Of these newly minted temporary visa-holding PhDs, in 2008 73.5 percent reported the intention to remain in the United States; this number was generally much higher among those PhDs who had come from developing and post-Communist countries. Meanwhile, the out-migration of the highly skilled is having dramatic consequences on the resource base of sending countries: for instance, 41 percent of all tertiary-educated Caribbeans have emigrated to developed countries; for West Africa the figure is 27 percent; and for East Africa it is 18.4 percent. 125 This mas-sive brain drain is nothing to celebrate; it has caused major social ills in the developing world. But as an empirical matter brain drain is correlated with reduced technological potential, and when it comes to the narrow question of nuclear weapons development, reducing developing countries’ techno-logical potential is not necessarily a bad thing. One could try to turn this argument around and contend that since the brain drain has become so massive, state policies can do little to encourage or discourage it anymore. But in fact the brain drain still depends crucially on facilitative state policies, especially those of the United States and other receiving countries. 126 In the nuclear area in particular, there is no guarantee that those facilitative policies will continue. As noted at the outset of this article, nonproliferation concerns have led the United States to reduce sub-stantially the scope of its international civil nuclear cooperation programs over the past decades, and some nonproliferation advocates want to abolish them altogether.

### A2 MOX

#### Fast reactors are key to reducing proliferation and implement permanent de-militarization.

Alexander DeVolpi, 2-28-2010, been active in nuclear-arms policy and treaty-verification technology studies for over 25 years, Argonne National Laboratory, Argonne, Illinois (and other national laboratories) involved nearly 40 years of lab, field, and analytical activities in instrumentation, nuclear physics, nuclear engineering, reactor safety, radioisotopes, experiments, verification technology, and arms control, the Defense Nuclear Agency, On-Site Inspection Agency, all the Department of Energy weapons labs, with the Departments of Defense and State, author or coauthor of several books, Ph.D. in physics (and MS in nuclear engineering physics) from Virginia Polytechnic Institute, certificate from the Argonne International Institute of Nuclear Science and Engineering, managing nuclear diagnostics for the Reactor Analysis and Safety Division at Argonne, and becoming technical manager of the arms-control and nonproliferation program, Who’s Who in Frontiers of Science and Technology, American Men and Women of Science, fellow of the American Physical Society, technical consultant in the Federation of American Scientists/Natural Resources Defense Council joint project, ScienceTechnologyHistory, “NUCLEAR EXPERTISE: The Amory Lovins Charade,” <http://sciencetechnologyhistory.wordpress.com/article/nuclear-expertise-the-amory-lovins-1gsyt5k142kc5-20/>

Soon to be needed in U.S. national policy will be a timely and well-advised decision on what it means to “abolish” (or even to “irreversibly reduce”) nuclear weaponry. Do we (as a nation and as a community of nuclear-armed nations) want nuclear arsenals to be reduced, not just put out of sight, but drawn down in an irreversible and verifiable way? If so, we will need to burn (consume, destroy) the weapons uranium and plutonium. This will put a big damper on the potential for weapons proliferation or reversion. Nuclear reactors are the logical (only practical) means for demilitarization of weapons materials, contrary to earlier, now revised assertions (Lovins has admitted a major turnabout in his published position about demilitarization). As an expert contributing to this important topic, I have written five Knols on nuclear demilitarization, posting these to make the analysis more available in the public domain than it is in my books and technical publications. With regard to nuclear demilitarization, the new presidential science advisor, John Holdren, is a rare special case: He has candidly and publically recanted his earlier ill-advised views and stewardship about the viability and utility of (MOX) reactor burnup of plutonium. That public retraction was huge, in my estimation.

#### We cause verification on nuclear stockpiles.

John Carlson, 6-4-2009, director general of the Australian Safeguards and Non-proliferation Office, “New Verification Challenges”, research paper has been commissioned by the International Commission on Nuclear Non-proliferation and Disarmament, <http://icnnd.org/Documents/Carlson_Verification_090604.doc>

The verification challenges for the FMCT are expected to be: having to implement verification approaches in old facilities not designed with verification in mind. These are likely to require intensive verification effort - the more of these facilities that can be shut down and decommissioned, the more manageable the verification task will be:- there will be no reason to continue operation of facilities used only for weapons programs (since the NWS have had informal moratoria on fissile production for weapons for many years, presumably no such facilities are operating now);- there should be little if any need to produce HEU (the states with large naval propulsion programs have extensive HEU stocks to draw on);- with advanced spent fuel recycling technologies which will avoid the need to separate plutonium – such as pyro-processing – on the horizon, there should be little or no requirement for new conventional (Purex-based) reprocessing plants, and existing plants could be phased out over time; the verification workload. This highlights the importance of shutting down as many sensitive facilities as possible, and transitioning to new fuel cycle technologies. A state-level approach, discussed below, will also be important for cost-efficient verification; establishing a reliable capability for detecting undeclared fissile material production.

#### U.S. cooperation on fast reactors is key for Russia remaining globally competitive.

Andrei Reznichenko, 12-3-2012, The Telegraph, “Russian nuclear agency Rosatom plans fast reactors,” <http://www.telegraph.co.uk/sponsored/russianow/business/9718975/rosatom-nuclear-reactors.html>

Research and design work on the SVBR-100 reactor will continue until the end of 2014, while operations proper are set to begin in 2017. Potentially, it could take 10 to 15pc of the global nuclear energy market for small and medium-sized power stations. “Fast reactors are the basis of our [global] competitiveness,” says Mr Kiriyenko. “These include the fast-neutron reactors that already exist at Beloyarsk, lead-bismuthic reactors, lead reactors and other liquid metal coolants. All of these technologies will allow us to utilise the U-238 [highly enriched] isotope in the fuel cycle, which is abundantly available in nature but is currently almost unused.” According to Mr Kiriyenko, the United States is a key partner for developing new types of reactors for the company. “We can conduct joint R&D to develop a new generation of nuclear reactors; such co-operation should go on between our two countries on a national level and not be restricted to just one company,” he said.

### A2 PRISM causes prolif

#### No fast reactor proliferation risk – mixed processing stream and safeguarded facilities – Green’s wrong.

Barry Brook et. al, 2-21-2009, a leading environmental scientist, holding the Sir Hubert Wilkins Chair of Climate Change at the School of Earth and Environmental Sciences, and is also Director of Climate Science at the University of Adelaide’s Environment Institute, published three books, over 200 refereed scientific papers, is a highly cited researcher, received a number of distinguished awards for his research excellence including the Australian Academy of Science Fenner Medal, is an International Award Committee member for the Global Energy Prize, Australian Research Council Future Fellow, ISI Researcher, Ph.D., Macquarie University in Environmental Engineering, Science Council for Global Initiatives, Edgeworth David Medal Royal Society of NSW, Cosmos Bright Sparks Award, Tom Blees is the author of Prescription for the Planet, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, George S. Stanford is a nuclear reactor physicist, part of the team that developed the Integral Fast Reactor, PhD from Stanford University in Physics, Masters from University of Virginia in Engineering, worked at Argonne National Laboratory, Graham R.L. Cowan, "Boron: A Better Energy Carrier than Hydrogen?" in 2001, published "How Fire Can Be Tamed," BraveNewClimate, “Response to an Integral Fast Reactor (IFR) critique,” <http://bravenewclimate.com/2009/02/21/response-to-an-integral-fast-reactor-ifr-critique/>

[In point of fact, anyone hoping to make a bomb from plutonium will likely try to obtain an isotopically more pure plutonium by creating it from U-238 (depleted uranium) at a small research reactor. To a great extent the proliferation threat of power reactors is overblown in light of this, but nevertheless proliferation resistance should always be a priority whenever fissile material is in circulation. Green’s warning about IFRs being more dangerous in this regard is incorrect, since LWRs produce plutonium as well, and it’s in their spent fuel. Either way you need a PUREX process to extract the (isotopically inferior) plutonium. This whole issue is one of the most common misconceptions about the IFR system, and one of many under which Mr. Green is laboring. I discuss at length in Prescription for the Planet how and where IFRs would be deployed in order to minimize proliferation risks. As for breeding high-quality (I assume Green means weapons-grade) plutonium, virtually any reactor (including research reactors) can do that by wrapping a U-238 blanket around the core and letting it get bombarded with neutrons for a while, then removing it and extracting the Pu with the PUREX method. It requires relatively brief exposure, which is NOT what one would have in a reactor core operated for power purposes. Again, as I’ve pointed out here and in my book, fissile material should all be subject to rigorous international oversight. In P4TP I deal with just how to do that in some detail. [GS] If their IFR plants were safeguarded, the material in the processing stream would be highly undesirable and their chances of diverting it undetected would be slim indeed. If not safeguarded, they could do what they could do with any other reactor — operate it on a special cycle to produce good quality weapons material. But in either case, most likely they would do what everyone else has done: construct a special production facility. Detecting such a clandestine facility is probably the main, immediate challenge facing international safeguards, and has nothing to do with whether a country has IFRs or LWRs.

#### No cascade impact to proliferation – its all alarmist rhetoric.

Muthia Alagappa, 2008, Distinguished Senior Fellow, East-West Center, “The Long Shadow: Nuclear Weapons and Security in 21st Century Asia,” accesed: 1-6-09, p. 521-2, Google Books

It will be useful at this juncture to address more directly the set of instability arguments advanced by certain policy makers and scholars: the domino effect of new nuclear weapon states, the probability of preventative action against new nuclear weapon states, and the compulsion of these states to use their small arsenals early for fear of losing them in a preventive or preemptive strike by a stronger nuclear adversary. On the domino effect, India’s and Pakistan’s nuclear weapon programs have not fueled new programs in South Asia or beyond. Iran’s quest for nuclear weapons is not a reaction to the Indian or Pakistani programs. It is grounded in that country’s security concerns about the U ntied States and Tehran’s regional aspirations. The North Korean test has evoked mixed reactions in Northeast Asia. Tokyo is certainly concerned; its reaction, though, has not been to initiate its own nuclear weapon program but to reaffirm and strengthen the American extended deterrence commitment to Japan. Even if the U.S.-Japan security treaty were to weaken, it is not certain that Japan would embark on a nuclear weapon program. Likewise, South Korea has sought reaffirmation of the American extended deterrence commitment, but has firmly held to its nonnuclear posture. Without dramatic change in it’s political, economic, and security circumstances, South Korea is highly unlikely to embark on a covert (or overt) nuclear weapon program as it did in the 1970s. South Korea could still become a nuclear weapon state by inheriting the nuclear weapons of North Korea should the Kim Jong Il regime collapse. Whether it retains or gives up that capability will hinge on the security circumstances of a unified Korea. The North Korean nuclear test has not spurred Taiwan or Mongolia to develop nuclear weapon capability. The point is that each country’s decision to embark on and sustain nuclear weapon programs is contingent on its particular security and other circumstances. Through appealing, the domino theory is not predictive; often it is employed to justify policy on the basis of alarmist predictions.

## Spent fuel

### A2 sodium accidents

#### No risk of accidents – chemical benefits and engineering experience.

Barry Brook & Tom Blees, 10-23-2012, a leading environmental scientist, holding the Sir Hubert Wilkins Chair of Climate Change at the School of Earth and Environmental Sciences, and is also Director of Climate Science at the University of Adelaide’s Environment Institute, published three books, over 200 refereed scientific papers, is a highly cited researcher, received a number of distinguished awards for his research excellence including the Australian Academy of Science Fenner Medal, is an International Award Committee member for the Global Energy Prize, Australian Research Council Future Fellow, ISI Researcher, Ph.D., Macquarie University in Environmental Engineering, Science Council for Global Initiatives, Edgeworth David Medal Royal Society of NSW, Cosmos Bright Sparks Award, Tom Blees is the author of Prescription for the Planet, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, BraveNewClimate, “The Case for Near-term Commercial Demonstration of the Integral Fast Reactor,” <http://bravenewclimate.com/2012/10/23/the-case-for-near-term-commercial-demonstration-of-the-integral-fast-reactor/>

One of the issues most often mentioned when discussing sodium-cooled fast reactors—by far the type with the most reactor-years of experience worldwide—is the chemical reactivity of sodium, which burns upon contact with air (though with a very cool flame) and reacts quite dramatically upon contact with water. Yet sodium has several compelling advantages in fast-reactor operation: superior heat-exchange properties, virtually no corrosive effect on reactor components even after decades of operation, short half-life of sodium isotopes that form in the reactor vessel, etc. (see previous section). Some advocates of other systems characterize sodium’s volatility as a deal-breaker. But the intermediate loop that transfers heat from the reactor vessel to the steam generator contains only non-radioactive sodium, with the steam generator isolated in a separate structure, assuring that in the highly unlikely event of a sodium-water reaction there will be no danger to the primary system and no chance of radioactive material being involved. This design means that the unfairly characterized sodium problem is nothing more than an engineering design issue, involving a common element that has been used in industrial processes for well over a century.

#### Sodium fires are easily contained and prevented – any potential leaks have no safety risk and are only contained to protect plant investments.

Charles E. Till & Yoon Il Chang, 2011, longtime Associate Laboratory Director for Engineering Research at Argonne National Laboratory, directed civilian nuclear power reactor development at Argonne National Laboratory, PhD Engineering, Specialty Reactor Physics, Imperial College, University of London, National Research Council of Canada, United Kingdom Atomic Energy Authority , Fellow of the American Nuclear Society, awarded the Walker Cisler Medal, National Academy of Engineering, was at Argonne National Laboratory, General Manager of the Integral Fast Reactor Program, Associate Laboratory Director for Engineering Research, Interim Laboratory Director, Argonne Distinguished Fellow, Currently he also serves as the Chair of IAEA’s Technical Working Group on Nuclear Fuel Cycle Options and Spent Fuel Management, was awarded the U.S. Department of Energy’s prestigious E.O. Lawrence Award, a Fellow and a recipient of the Walker Cisler Medal of American Nuclear Society, M.E. in Nuclear Engineering from Texas A&M University, and his Ph.D. in Nuclear Science from The University of Michigan, Science Council for Global Initiatives (SCGI), Plentiful Energy: The Story of the Integral Fast Reactor, p. 162-3

Liquid sodium reacts readily with air, and the oxidation reaction can be rapid and lead to a sodium fire. Burning sodium produces a dense white sodium oxide smoke. The heat, though, is much less than that of conventional hydrocarbon fires. The flame height is also an order of magnitude lower. Both allow a close approach for firefighting. The ignition temperature varies widely depending on the form of sodium, its moisture content in air, and other factors. Solid chunks cannot be ignited quickly even with a torch. A stirred liquid pool can be ignited at a temperature as low as 120◦C. For sodium fires, conventional firefighting agents are normally useless. In general, fluids cannot be used, because either they are flammable or they react violently with sodium. Only inorganic powders are used for extinguishing sodium fires. Dry silica sand, MET-L-X (fine, treated NaCl), and dry soda ash are all used. The dense cloud of aerosols does interfere with firefighting. Small sodium fires are readily extinguished by large sodium fires are difficult to extinguish. Reactors are designed to effectively limit sodium leaks and to control sodium fires. The sodium in the primary system is blanketed with inert gas and maintained in double containment. The reactor vessel has a guard vessel, and the pipes have guard pipes around them. Leak detection monitors are installed in the inert gas in the gaps between the vessels and between the pipes. A variety of sodium leak detection systems are used.

## 2AC electricity prices DA

#### Natural gas causes electricity price spikes – diversifying our portfolio is key – no switch to coal.

Meg Handley, 3-28-2013, is a reporter for U.S. News & World Report, U.S. News, “Is the U.S. Too Dependent on Natural Gas for Electricity?,” <http://www.usnews.com/news/articles/2013/03/28/is-the-us-too-dependent-on-natural-gas-for-electricity>

Still, over the longer term, new air pollution regulations that are expected to come from the Environmental Protection Agency will make it increasingly uneconomical to build new coal plants, reducing coal capacity by 20 percent according to some estimates and increasing the nation's reliance on natural gas. That's prompted concerns that the United States might be putting all of its eggs in one basket when it comes to the nation's electric grid, especially since natural gas prices have historically been quite volatile and subject to steep spikes. "There's a changing balance in [our energy portfolio] with nuclear capacity projected to be cut in half and coal capacity reduced by 20 percent," says Rob Patrylak, a managing director of Black & Veatch. "We're going to be very dependent on natural gas and any price swings are going to be very significant." Recent debate swirling around exporting natural gas has keyed into the potential for price spikes, with a coalition of manufacturers and industry trade groups lobbying Congress to withhold significant exports. While the current supply picture is encouraging — the EIA projects gas production to increase over the next three years — the combination of proposed exports and increased domestic demand could result in "significant price increases," says Dave Schryver, executive vice president at the American Public Gas Association.

#### Without the plan prices will comparatively skyrocket – new emission standards and alternatives.

Henry D. Jacoby & Sergey Paltsev, March/April 2013, is a professor of management in the MIT Sloan School of Management and former codirector of the MIT Joint Program on the Science and Policy of Global Change. He serves on a National Academies committee to advise the US Global Change Research Program, and is a convening lead author for the mitigation chapter of the US National Climate Assessment, Sergey Paltsev is a principal research scientist at the MIT Energy Initiative and assistant director for economic research for the MIT Joint Program on the Science and Policy of Global Change. He serves on an advisory board for the Global Trade Analysis Project, an international network of researchers and policy makers, and is a lead author for the Intergovernmental Panel on Climate Change, Bulletin of the Atomic Scientists, Vol. 69 No.2, “Nuclear exit, the US energy mix, and carbon dioxide emissions,” <http://bos.sagepub.com/content/69/2/34.full>

The phase-out of nuclear generation also will increase the price of electricity. Prices are projected to increase even with no nuclear exit. Assuming a continuation of the current policy on greenhouse emissions, the price will rise (in real terms) from 10 cents per kilowatt-hour to around 16.5 cents by 2050, in response to rising costs of fuel (mainly natural gas) and other inputs. Imposition of regulatory measures, driving out cheap coal and mandating more expensive renewables, will further increase the 2050 price to around 18.5 cents. Meeting the 50 percent national emissions-reduction target will drive the price even further, to more than 26 cents per kilowatt-hour, because of the growing requirement of carbon capture and storage for both gas and coal and the pushing of renewables into less cost-effective applications. Under current climate policy, the effect on the electricity price of a nuclear phase-out is very small, because relatively cheap coal and natural gas can fill the gap it leaves. With policies that drive out coal or penalize the carbon dioxide emissions of power generation based on fossil fuels, the nuclear exit leads to an increase in price over and above what would otherwise exist under the particular climate policy. Under regulatory measures the price increase is about 1 cent per kilowatt-hour by 2050, as relatively cheap natural gas will replace the nuclear generation. If the 50 percent national emission target is imposed, the impact of nuclear exit is greater, adding some 2 cents to 2.5 cents per kilowatt-hour. There are 126 million residential electricity customers in the United States, with an annual average consumption in 2011 of 11,300 kilowatt-hours, so an increase in electricity prices of 1 cent per kilowatt-hour yields a $90 increase in annual electric bills. It is reasonable to assume that most of the effects of this price increase will be passed forward, to show up in the cost of other goods. To consider the larger impact, therefore, note that, for 2011 US consumption of 3,860 billion kilowatt-hours, a cost increase of 1 cent per kilowatt-hour would yield to a national increase of up to $39 billion overall. Spread across 115 million households, a 1 cent increase would impose an additional annual cost of approximately $336 per household.

#### Natural gas bottlenecks cause massive price spikes – grid unreliability.

Meg Handley, 3-20-2013, USNews, “Increased Dependence on Natural Gas Exposes Holes in U.S. Electrical Grid,” <http://www.usnews.com/news/articles/2013/03/20/increased-dependence-on-natural-gas-exposes-holes-in-us-electrical-grid>

Increasing use of natural gas to generate electricity in the United States might be helping the environment, but it's also exposing some serious issues in how the electric and natural gas industries work together — issues that could ultimately result in dangerous power outages if not addressed, experts warn. Thanks to massive discoveries of natural gas in shale formations across the country, the United States generates 40 percent of its electricity from natural gas, up from 20 percent just a few years ago. At the current pace, the nation's electricity generation from natural gas will double in 10 years, according to some estimates. The shift to more natural gas is just the most recent transformation affecting the nation's electric grid. After the Arab oil embargo, more coal plants were built. When nuclear power was on the rise, that form of electricity generation also had to be integrated into the grid. "This is another big adjustment," says Carol LaFleur, a commissioner at the Federal Energy Regulatory Commission. "This isn't unprecedented — these things come in cycles." Still, recent high profile incidents resulting in power outages due to less-than-ideal coordination between the natural gas and electric industries have prompted policymakers and government agencies to investigate the nation's increasing reliance on natural gas-generated electricity. As recently as February 2011, unseasonably cold weather and supply issues resulted in millions of people losing power in Texas and thousands more losing natural gas service in New Mexico. New England's heavy reliance on natural gas has created particularly acute challenges when it comes to maintaining a reliable power system, the region's grid operator said Tuesday in prepared testimony to the House Committee on Energy and Commerce. [READ: U.S. Winning the Clean Energy Race] Limited pipeline capacity is the primary culprit, Gordon van Welie of ISO New England testified, arguing that the region cannot access abundant shale gas with the current infrastructure in place. Those bottlenecks could ultimately result in electricity price spikes for consumers as they did in January, when New England was paying eight times what other regions were paying for natural gas, even though the winter was relatively mild. "This winter, New England did not experience record or sustained cold temperatures, or unusually high demand for electricity; however, wholesale electricity prices rose significantly during this period because of physical constraints moving the lowest-priced natural gas into New England," van Welie said. Philip Moeller, another commissioner at FERC, is concerned about what happens when demand rises due to extreme winter weather. In testimony delivered before the House committee, Moeller warned that unseasonably warm winters in recent years could be masking vulnerabilities in the nation's electric system that could be exposed as soon as severe cold hits. "The challenges are serious, very real, and somewhat urgent, especially in New England and the Midwest," Moeller said in prepared testimony. "Indeed, some in the industry believe nothing short of a major blackout will provide motivation to the various stakeholders to solve the problems facing us."

#### A gas spike will wreck the economy absent the aff.

Christine T. Whitman, 5-9-2012, former EPA Administrator and Governor of New Jersey, “It's dangerous to depend on natural gas,” CNN Money, http://tech.fortune.cnn.com/2012/05/09/christine-whitman-nuclear-energy/

The United States needs an "all of the above" energy strategy that focuses on low-carbon electricity sources that will lower energy costs, reduce dependency on foreign fuel sources and promote clean electricity. This is a prudent strategy to help drive American manufacturing and transportation networks of the future. Most importantly, this approach can put the country on a sustainable path toward long-term economic growth. While today's rock-bottom natural gas prices are attractive, an unbalanced dependence on natural gas in the electricity sector would put Americans at risk, both economically and in terms of longer term energy security.While many look at energy prices from today's lens, successful energy policy requires a long view that promotes fuel diversity but doesn't pick technology winners; it preserves our air, land and water and is affordable for consumers.We need only look at the volatile history of natural gas prices. Consider the shift from the low, stable prices of the 1990s to the record-high rates and wild supply fluctuations of the mid-2000s.We should take advantage of our domestic energy resources, recognizing that today's natural gas market is still vulnerable. The present oversupply of natural gas opens opportunities for exports into foreign markets at prices two-to-three times higher. If demand from other countries increases as they meet growing energy demand, it will cause our prices to align with higher world prices. During my tenure as governor of a state that relies heavily on nuclear energy, I can attest to the cost effectiveness of nuclear fuel and the protection it offers against price spikes in natural gas or future environmental controls such as a cost on carbon. Nuclear energy doesn't emit any greenhouse gases or controlled pollutants while producing power and it is affordable, predictable and efficient. Moreover, a nuclear power plant with a footprint of one square mile generates the same amount of energy as 20 square miles of solar panels or 2,400 wind turbines spread out across 235 square miles.

#### PRISMs are elastic with energy demand - they fit in seamlessly.

Tom Blees, 2008, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, Prescription for the Planet, p. 291-2

One of the problems with generating electricity is that you can’t store it all that easily. Converting it from one form to another and back again entails quite unacceptable losses. Another big problem is that demand is necessarily sporadic. Since power plants cost a lot of money to build, nobody wants to build too much capacity into the system knowing that much of the generating potential will be idled a lot of the time. The problem is only compounded when we begin to add in solar and wind power, for both suffer from the fickleness of nature’s whims. Wind is as flighty as, well, the wind. Solar is more predictable (but those cloudy days don’t help), though it obviously peaks in the early afternoon whether you like it or not, while residential demand tends to peak in the evening when people come home from work. This is especially critical during hot weather, when millions of air conditioners kick in at full blast around five o’clock, just about the time the sun is getting low in the sky. The cost of IFRs will be nothing to sneeze at, even taking mass production into account. We don’t want those plants sitting idle or running at half power. This is where the synergy of boron recycling to electrical generation can pay tremendous dividends and maximize efficiency of the total energy picture. For boron recycling plants need not run at full capacity all the time. They can run at whatever rate they can draw power. All they have to be able to do is to keep enough recycled boron available to meet local demand. Almost everyone’s had the experience of using rechargeable batteries, which can be very handy except when they start to get old and refuse to hold their charge. Any electricity storage system would292have to be able to avoid that problem, and boron fills the bill perfectly because it’s inert. Its potential energy today will be the same next week, next month, or next year. Thus it can act like a giant rechargeable battery to soak up excess electricity whenever it’s available. When electricity demand rises, the boron recycling plants would just throttle back and produce less boron. In extraordinary circumstances they could even shut down for a while altogether, though in an integrated energy system a balance would inescapably be found to maximize both the electrical generation and boron recycling systems. Thus the grids would be provided with ample power in any contingency without the costly necessity of building needless overcapacity into the system. Wind and solar contributions would fit in seamlessly, fully integrated into the energy symbiosis, while the power plants would be able to run at full power virtually around the clock. Hydroelectric plants, of course, are fully adjustable, and reducing their flow in times of low electricity demand would only leave more water in the reservoirs for later use.

#### Nuclear energy causes a decrease in prices.

Marvin S. Fertel, 9-13-2010, is President and Chief Executive Officer of the Nuclear Energy Institute. He has 35 years of experience consulting for electric utilities on issues related to designing, siting, licensing and managing both fossil and nuclear plants, Clean Energy Insight, “Fertel: Nuclear Energy is the Clean Energy Job Engine,” <http://www.cleanenergyinsight.org/energy-insights/fertel-nuclear-energy-is-the-clean-energy-job-engine/>

Advanced reactor designs are higher capital cost projects, but the actual cost of electricity from these facilities will be competitive in the marketplace. Today’s reactors have among the lowest electricity production costs in the sector. Based on estimates for new reactor development, the U.S. Energy Information Administration (EIA) projects that electricity production costs will be competitive, and in fact, cheaper than most alternatives in 2016. Affordable electricity for 60 years or more With low uranium fuel costs and capacity factors (a measure of reliability) that average 90 percent across our industry, nuclear plants compensate for the up-front construction costs by affordably producing electricity for 60 years or more. Financing new nuclear plants is one of the industry’s biggest challenges, but it is being met with support from state and federal energy policy. Federal loan guarantees can help project sponsors access lower-cost financing for nuclear and other clean-energy power projects, which ultimately lowers the cost of a new nuclear power plant and delivers lower-cost electricity to the consumer.

## Niger DA

#### Looking to diversifying its energy mix – domestic construction will solve these issues.

Nicolas Dasnois, September 2012, is a political analyst, worked at the French Ministry of Foreign Affairs in Paris, and at the French Embassy in Nairobi as political officer in charge of the UN Environment and Human Settlements programmes, OCCASIONAL PAPER NO 122, “Uranium Mining in Africa: A Continent at the Centre of a Global Nuclear Renaissance,” <http://dspace.cigilibrary.org/jspui/bitstream/123456789/33386/1/saia_sop_122%20_dasnois_20121005.pdf>

In the long term there is also talk of African countries and regions building their own nuclear reactors. Currently, South Africa has the continent’s only nuclear power plant at Koeberg in the Western Cape Province. Yet Africa’s energy situation is dire: less than one third of Africans (30.5%) have access to electrical power.24 Governments are trying to remedy this situation, and given the continent’s considerable uranium reserves it makes sense to consider nuclear power as a possible solution even if building a nuclear power plant is a very costly enterprise. South Africa views its medium-term energy supply as coming in part from nuclear power (13.4% in 2030): Areva, Westinghouse Electric Company of the US, South Korea’s Korean Electric Power Corporation, Moscow-based Rosatom Nuclear Energy State Corporation and Chinese interests are still competing for the contract to build another nuclear plant in the country.25 Namibia is also considering diversifying its energy mix and is investigating the potential of the rest of the nuclear fuel cycle.26 In Tanzania, Areva is looking into co-operation with Tanzanian authorities to build a nuclear power plant.27 The Kenyan government has long been considering a regional nuclear power plant,28 although already investing heavily in hydrothermal energy. In West Africa, Niger has expressed interest in regional co-operation to build an Economic Community of West African States – Ecowas – nuclear power plant.29 Nigeria is also investigating nuclear power.30

#### Economy economy is resilient – diversified economy.

TNN, 8-6-2012, Travel News Namibia, “Investment continues in Namibia despite global economic uncertainty,” <http://travelnewsnamibia.com/archives/flamingo-magazine/investment-continues-in-namibia-despite-global-economic-uncertainty/#.UOTMQmHTkbw>

Namibia has a strong track record of attracting foreign investment and many well-known international companies play an active role in a wide variety of sectors including agriculture, fishing, mining, manufacturing, construction, tourism, telecoms and financial services. The Namibian Constitution promotes foreign investment and protects private property. Every month Flamingo brings you a round-up of the most important business and economics news from Namibia put together by Robin Sherbourne of local economic consulting company Namibian Economics. Otjihase and Matchless copper mines, owned by AIM-listed Weatherly International, resumed operations after being placed under care and maintenance at the end of 2008 due to the drop in copper prices that came about as a result of the world economic crisis. Ohorongo Cement’s state-of-the-art 700 000-tonne cement plant near Otavi was officially inaugurated by President Pohamba. The plant is majority owned by Schwenk of Germany and is designed to supply both the local market and export to southern Angola, Zambia and Botswana.

#### Demand will ensure it’s fine in the short-term.

Anthony Fensom, 11-1-2012, is an experienced business writer and communication consultant with more than a decade's experience in the financial and media industries of Australia and Asia, The Diplomat, “Atomic Allies?: India and Australia Explore Uranium Sales,” <http://thediplomat.com/pacific-money/2012/11/01/atomic-allies-india-and-australia-explore-uranium-sales/>

Despite earlier ruling out a policy change, recently elected Premier Campbell Newman announced on October 22, just days after Gillard’s return from India, that Queensland would join other states in actively pursuing uranium mining. “The Prime Minister Julia Gillard has just been in India selling the benefits of Australian-produced uranium to India, prompting many in the community to ask about the industry’s potential in Queensland,” Mr. Newman said in a statement. “It’s been 30 years since there was uranium mining in this state, and in that time Northern Territory, South Australia and Western Australia have carved out successful uranium industries that deliver jobs and prosperity to their regions.” Despite ruling out any nuclear energy production or waste disposal plants in Queensland, environmental critics denounced the move. "This is not the time for Queensland to give a green light to yellowcake," Australia Conservation Foundation Northern Australia Acting Manager Andrew Picone said. "There is no compelling economic case, there is no accepted social license and the lessons of Fukushima need to be addressed not ignored. This industry is unsafe, unwelcome and underperforming." However, the Queensland Resources Council (QRC) welcomed the move as overturning the previous government’s “illogical stance.” “The government's decisive action…will provide a strong boost to the regional economies of north and north-west Queensland,” QRC chief executive Michael Roche said in a statement, estimating the creation of 1,000 permanent jobs and 2,500 construction jobs as well as AUD$900 million in state royalties. Yet while Queensland may have changed course, its southern counterparts in New South Wales and Victoria – also ruled by conservative governments – have shown no inclination to reverse their mining bans. Crisis, what crisis? Led by China and India, the global nuclear power industry appears to have shrugged off any sense of crisis after Japan’s March 2011 Fukushima meltdown. Currently around 450 plants are in operation worldwide, with an additional 65 under construction, 160 planned and 323 proposed, with countries including the United States keen to secure low emission, base-load power. According to mining analyst Edward Sterck of BMO Capital Markets, nuclear power expansion in China, the Middle East and Russia as well as India will increase global capacity by 37 percent by the end of the decade. “In terms of demand for uranium, this translates into demand growth from 185 million pounds today to 278Mlb by 2010 and 304Mlb by 2025,” he told the Investing in Asian Mining Indaba conference in Singapore on October 29.

## 2AC CIR

#### The US is locked in as a power and immigration is irrelevant - demographics will affect all other nations more than the united states if it is an issue.

TRESTON WHEAT, 11-10-2010, COLUMNIST, Concerns about US hegemony overstated http://utdailybeacon.com/opinion/columns/immutably-right/2010/nov/10/concerns-about-us-hegemony-overstated/

 Every country and region has its own problems, which could limit its growth and influence in the world. During the 1990s, many people believed that Japan would overtake America as the largest economy, but then an economic collapse in the country has now prevented it from having the influence everyone thought it would. Places like China, India and others might not pose the threat many people assume because of their own problems. The United States has feared China as a rising power for two centuries, because we always saw its potential. China’s economy may have grown steadily, but there are certain demographic and political problems with the country. First, China’s one-child policy is actually working, which has two problems. The 4-2-1 problem means that four grandparents have two parents who have one grandchild. This seriously limits the number of workers in the population and creates an aging population. In addition, the numbers of births for women have reduced from five in the 1970s to only 1.8. This is bad for China, because a country needs a birthrate of 2.1 to maintain its economy. Therefore, although China gains economic power, if its birthrate continues to decline, the country will face irreversible problems. Besides a demographic problem, China also faces a severe political predicament. The government oppresses the people to the point where there is little individual freedom if they have more choice in the economy. They face a possible revolution or breaking down of the government because the people want freedom. Just look at the recent Nobel Peace Prize winner, Liu Xiaobo. He is a man fighting for political freedom, which could have radical implications for the country’s future. Another rising power is the world’s largest democracy. India is becoming one of the largest economies in the world and gaining military strength, but its demographic problems also pose a challenge to its growing power. The adult literacy rate is about two-thirds, and more than 40 percent of the country lives in poverty. There are many new jobs and education opportunities in the country, but this is not enough to help a country of its size. Hundreds of millions of people are still in abhorrent conditions. Although there are demographic problems, India is always near war, and possibly nuclear war, with Pakistan because of the contentious ethnic and border issues, especially concerning Kashmir. Also, India is facing terrorist problems. Although people know about Islamist attacks like in Mumbai, they do not often know that India has a situation with Maoist terrorists. In April of this year, the Naxalite-Maoist insurgency of 1,000 led an assault that killed 76 policemen in the Chattisgarh’s Dantewada district. Other possible challengers to U.S. hegemony are the European Union, Russia and Japan. The latter two have decreasing populations, which will limit the number of workers in their countries and negatively impact the economy in coming decades. Russia continues to have authoritarian tendencies, and it has terrorist problems as well, like Chechen terrorists. In the last few years, violence has drastically increased, and suicide bombers have quadrupled. The EU has illegal and legal immigration problems, but more importantly, adding new countries from the Eastern Bloc and bailing out countries like Greece pose major economic problems. The largest expenditure of the EU is agricultural subsidies. Soon the larger economies in the community will prop up the weaker economies that are too poor to help themselves. Furthermore, the EU is finding it nigh impossible to create a unified foreign policy that could challenge U.S. dominance. This is not to say that America does not have problems of its own. However, it is important to note that when analysts claim America’s place in the world is threatened by rising powers, remember that these powers also face negative oscillations. It is impossible to know where the world will end up in the next century. China, India, the EU, Russia, Japan, etc., are all rising powers that rival America, but their own domestic issues are just as threatening, if not more so, than ours. Immigration, demographics, terrorism and poverty are no Lilliputian tribulations. Yet, empires rise and fall, but America’s place in the world and in history is not as threatened as one might think.

#### CIR would only increase H-1B through a new commission.

Patrick Thibodeau, 1-4-2010, staff writer @ Computer World, House immigration bill woudl overhaul H-1B visa program, p. www.computerworld.com/s/article/346045/House\_Immigration\_Bill\_Would\_Overhaul\_H\_1B \_Visa\_Program

But this House bill, dubbed the Comprehensive Immigration Reform for America's Security and Prosperity Act, also incorporates parts of other bills that impose restrictions on H-1B use and call for tougher enforcement. The proposal would create a new, independent federal agency, to be called the Commission on Immigration and Labor Markets, that would establish "employment-based immigration policies that promote economic growth and competitiveness while minimizing job displacement, wage depression and unauthorized employment." In particular, the new agency would make recommendations to Congress about caps for H-1Bs and other types of visas.

#### That gets struck down by the Court.

NFAP (National Foundation for American Policy), May 2009, “A commission to regulate immigration? A bad idea whose time should not come,” Online

On top of all its other problems, the commission as proposed by Ray Marshall is likely unconstitutional. Under Buckley v. Valeo, the U.S. Supreme Court ruled that a legislative appointee cannot exercise executive branch authority. But that is what is envisioned for the commission proposed by Marshall. As noted, according to the book, Immigration for Shared Prosperity, “The chair and four other members would be chosen by the President, and remaining members would be chosen one each by House and Senate Democratic and Republican leaders.”18 Among the duties of these commission members would be to “set the conditions and numbers of the various visa categories” and potentially eliminate entire categories of visas.19 Elsewhere, Marshall writes, “The FWAC would recommend employment-based immigration levels, which would become law if Congress did not reject them.” In Buckley v. Valeo (1976), the U.S. Supreme Court struck down as unconstitutional the powers of the Federal Election Commission due, in part, to its members being appointed by Members of Congress. The decision cited the Disrict Court’s finding: The Commission's composition as to all but its investigative and informative powers violates Art. II, 2, cl. 2. With respect to the Commission's powers, all of which are ripe for review, to enforce the Act, including primary responsibility for bringing civil actions against violators, to make rules for carrying out the Act, to temporarily disqualify federal candidates for failing to file required reports, and to authorize convention expenditures in excess of the specified limits, the provisions of the Act vesting such powers in the Commission and the prescribed method of appointment of members of the Commission to the extent that a majority of the voting members are appointed by the President pro tempore of the Senate and the Speaker of the House, violate the Appointments Clause, which provides in pertinent part that the President shall nominate, and with the Senate's advice and consent appoint, all "Officers of the United States," whose appointments are not otherwise provided for, but that Congress may vest the appointment of such inferior officers, as it deems proper, in the President alone, in the courts, or in the heads of departments. Hence . . . the Commission, as presently constituted, may not because of that Clause exercise such powers, which can be exercised only by “Officers of the United States” appointed in conformity with the Appointments Clause, although it may exercise such investigative and informative powers as are in the same category as those powers that Congress might delegate to one of its own committees. Another case that may bear on the constitutionality of the Commission proposal is Bowsher v. Synar. A number of constitutional law experts consulted confirmed that the commission proposal as described in Ray Marshall’s book is unlikely to be upheld as constitutional given the Supreme Court precedents.

#### Empirically proven no impact to hege.

Christopher J. Fettweis, 2010, Professor of national security affairs @ U.S. Naval War College, “Threat and Anxiety in US Foreign Policy,” Survival, Volume 52, Issue 2 April 2010 , pages 59 – 82

One potential explanation for the growth of global peace can be dismissed fairly quickly: US actions do not seem to have contributed much. The limited evidence suggests that there is little reason to believe in the stabilising power of the US hegemon, and that there is no relation between the relative level of American activism and international stability. During the 1990s, the United States cut back on its defence spending fairly substantially. By 1998, the United States was spending $100 billion less on defence in real terms than it had in 1990, a 25% reduction.29 To internationalists, defence hawks and other believers in hegemonic stability, this irresponsible 'peace dividend' endangered both national and global security. 'No serious analyst of American military capabilities', argued neo-conservatives William Kristol and Robert Kagan in 1996, 'doubts that the defense budget has been cut much too far to meet America's responsibilities to itself and to world peace'.30 And yet the verdict from the 1990s is fairly plain: the world grew more peaceful while the United States cut its forces. No state seemed to believe that its security was endangered by a less-capable US military, or at least none took any action that would suggest such a belief. No militaries were enhanced to address power vacuums; no security dilemmas drove insecurity or arms races; no regional balancing occurred once the stabilis-ing presence of the US military was diminished. The rest of the world acted as if the threat of international war was not a pressing concern, despite the reduction in US military capabilities. Most of all, the United States was no less safe. The incidence and magnitude of global conflict declined while the United States cut its military spending under President Bill Clinton, and kept declining as the George W. Bush administration ramped the spending back up. Complex statistical analysis is unnecessary to reach the conclusion that world peace and US military expenditure are unrelated.

#### Won’t pass—

#### Border triggers.

David Grant, 3-27-2013, “How border security 'trigger' could stop immigration reform,” http://www.csmonitor.com/USA/DC-Decoder/2013/0327/How-border-security-trigger-could-stop-immigration-reform

How border security 'trigger' could stop immigration reform Congressional negotiators say immigration reform will need a border security 'trigger' to pass. But agreeing on what counts as 'border security' won't be easy, and could determine whether reform happens. Immigration reformers want to bring the more than 10 million undocumented immigrants out of the shadows. Border security hawks want assurances that if they go along with that plan, they won’t be back in 10 years deciding whether or not to legalize 10 million more. What’s Congress to do? Figure out a “trigger,” where advances in border security are deemed sufficient to trigger the beginning of the journey to citizenship for the undocumented already in the country. As immigration reform negotiations continue, determining just what counts as a “secure border” and how to link that to plans for the undocumented will be crucial. Indeed, finding an answer could determine whether a bipartisan immigration reform measure reaches President Obama’s desk or if 2013 is yet another disappointment for reformers. Historically, those on Capitol Hill have tried to craft a delicate balance between border security and a path to legal status for the undocumented. For example, the comprehensive immigration reform legislation of the George W. Bush years, which ultimately failed, had a series of triggers. In 2009, Sen. Chuck Schumer (D) of New York proposed more broadly that “operational control” of the border “must be achieved within a year of enactment of legislation.”

#### Delays coming over guest worker program.

David Nakamura, 3-28-2013 Washington Post “Guest-worker program dispute may delay immigration bill,” http://www.azcentral.com/news/politics/free/20130328immigration-reform-guest-worker-program-dispute-may-delay-bill.html

A bipartisan deal on immigration is at risk of stalling because of a worsening dispute over a new guest-worker program, exposing fault lines between crucial interest groups and threatening to delay the unveiling of a Senate bill early next month. The impasse has prompted a bitter round of name-calling between labor and business groups, both of whom accuse the other of imperiling comprehensive immigration reform. As the standoff has deteriorated, the Obama administration has remained on the sidelines and declined to intervene — a calculated decision that the president’s influence would risk alienating Republican senators crucial to the process. The dispute over a program for foreign workers has emerged as perhaps the most serious obstacle to a final deal from a bipartisan group of eight senators, who are attempting to fashion model legislation for broad immigration reform. The same issue helped derail the last serious attempt at reform in 2007 with help from Obama, then a U.S. senator from Illinois. The current talks center on rules governing the “future flow” of migrants who come to the United States for low-paying, menial jobs. Republicans, citing business interests, want to give temporary work visas to up to 400,000 foreign workers a year, mostly at minimum wages. But unions and many Democrats, fearing the impact on American workers, want fewer workers and higher pay under the program. Senators involved in the immigration talks insist they remain on schedule to complete a bill, including a path to citizenship for 11 million illegal immigrants, in early April. Obama also expressed confidence this week that the guest-workers disagreement could be solved. “I don’t agree that it’s threatening to doom the legislation,” Obama said in an interview Wednesday with Telemundo, the Spanish-language TV network. “Labor and businesses may not always agree exactly on how to do this, but this is a resolvable issue.” But behind the scenes, negotiations over the guest-worker program — and the White House’s refusal to take a position — have soured relations between the AFL-CIO and U.S. Chamber of Commerce, which only a month ago joined hands to publicly proclaim agreement on an overall plan.

#### That kills the bill – two reasons.

Ted Hesson, 3-28-2013, Reasons Why an Immigration Reform Timeline Matters” (ABC News), http://abcnews.go.com/ABC\_Univision/Politics/reasons-immigration-reform-timeline-matters/story?id=18822563#.UVPrYleVjIs

 A group of Democrats and Republicans working on an immigration reform bill in the Senate will almost certainly miss a self-imposed March deadline to produce draft legislation. And yesterday, one of the groups foremost members, Sen. John McCain (R-Ariz.), cautioned that a bill might not come in early April, either. Why does the deadline matter? Here are three reasons. 1. Momentum The November presidential election -- where Obama housed Romney among Latinos, taking 71 percent of the vote -- got people in Washington talking about immigration reform as a way for the Republican party to win Latino voters. But that was five months ago, and political memory can be short. "Once the sting of the election starts to wear off a little bit, I think there's less of an impetus to act on this issue," said Marshall Fitz, immigration policy director at the liberal Center for American Progress. "You've got to act when the issue is fresh and everyone is very cognizant of the political implications...The political implications aren't going to change as we go further into this, but the calculus of the members may start to get obscured." 2. Deportations Lots of interests groups would like to see an immigration deal inked sooner than later, but no one group feels the pressure more than immigrants who are living in the country without authorization. Even while President Obama stumps for a path to citizenship for undocumented immigrants, his administration continues to deport record numbers of people, many of them for immigration-related offenses. A recent report in The New York Times found that on any given day, about 300 people in immigration detention are kept in solitary confinement, treatment that could have lasting psychological effects. "There is a sense that every day of delay is a day in which people continue to be deported who would otherwise be eligible for relief," Fitz said. "It's not like delay is the status quo. The delay is continued active harm on the community and on immigrant families." 3. Primaries If the so-called Senate "Gang of Eight" working on immigration reform is able to produce a bill in April, the Senate and House could feasibly vote and pass legislation before the August recess in Congress. But any further significant delay could jeopardize that timeline. If Congress continues to negotiate the bill in the fall, some Republican members of the House facing reelection in 2014 may be less likely to give their support, fearing a primary challenger who will use the issue as a political cudgel. "I think the House leadership feels like they've got to get this done and behind them by [the August recess] because their guys are going to be unwilling to take a tough vote after that," Fitz said.

#### Energy trust fund thumps.

Andrew Restuccia, 3-20-2013, “Energy Security Trust faces big sticking point,” Politico Pro, http://www.politico.com/story/2013/03/offshore-drilling-energy-plan-faces-roadblock-89098.html

President Barack Obama will face an uphill climb in Congress with his bipartisan proposal to steer offshore drilling revenue into research on green energy and natural gas, key observers signaled Tuesday. Their comments come just days after Obama used a speech at a national research laboratory to pitch his Energy Security Trust proposal, which he described as a plan to protect the public from high gasoline prices. A major sticking point: the administration’s unwillingness to expand drilling to areas like the Arctic National Wildlife Refuge, as Republicans have proposed. A former top energy aide to Sen. Lisa Murkowski (R-Alaska) cast doubt Tuesday on whether policymakers can come to an agreement given that gap. “If this gets translated somehow into new taxes on the oil and gas industry to then pay for this, I don’t believe it’s going to happen,” said McKie Campbell, a partner at BlueWater Strategies and a former Republican staff director of the Senate Energy and Natural Resources Committee. The money for the administration’s plan is going to have to come from somewhere, Campbell said. “There has to be more revenue or it’s deficit spending,” he said during a panel discussion hosted by Securing America’s Future Energy.

#### Obama push would kill any chance of CIR.

Alex Altman, 3-20-2013, “Four Hurdles That Could Block Immigration Reform,” Washington correspondent for TIME, http://swampland.time.com/2013/03/20/four-hurdles-that-could-block-immigration-reform/

Little discussed but also looming is the possibility that Democrats drag their feet on reform. Liberals will balk if the path to citizenship is too long or too onerous, or if enforcement provisions are too rigid. Many conservatives also suspect that Democratic power brokers, despite their daily hammering of Republicans to get moving on immigration reform, many would privately prefer to keep the issue as a cudgel than actually pass a law. Barack Obama “wants to make a bill come out of the Senate that is so far out there that it would never pass, so that he can blame us for not being compassionate and use the issue to take back the House in 2014,” says a House Republican. Even some liberals see this as a plausible scenario. “There’s always a lingering doubt in my mind,” admits one House Democrat. Obama knows that putting his fingerprints on the deal is an easy way to kill it; when a draft of his proposal leaked in the press, he called Republican negotiators individually to apologize. But if negotiations in Congress bog down, he may not be so hands off.

#### Plan popular—

#### The plan would be a political motivator for nuclear power development – solves the waste issue.

Barry Brook & Tom Blees, 10-23-2012, a leading environmental scientist, holding the Sir Hubert Wilkins Chair of Climate Change at the School of Earth and Environmental Sciences, and is also Director of Climate Science at the University of Adelaide’s Environment Institute, published three books, over 200 refereed scientific papers, is a highly cited researcher, received a number of distinguished awards for his research excellence including the Australian Academy of Science Fenner Medal, is an International Award Committee member for the Global Energy Prize, Australian Research Council Future Fellow, ISI Researcher, Ph.D., Macquarie University in Environmental Engineering, Science Council for Global Initiatives, Edgeworth David Medal Royal Society of NSW, Cosmos Bright Sparks Award, Tom Blees is the author of Prescription for the Planet, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, BraveNewClimate, “The Case for Near-term Commercial Demonstration of the Integral Fast Reactor,” <http://bravenewclimate.com/2012/10/23/the-case-for-near-term-commercial-demonstration-of-the-integral-fast-reactor/>

Light-water reactors (LWR) of any stripe, however, produce only a tiny fraction of the potential energy in uranium, less than 1%. Fast reactors, in contrast, unlock nearly all of it. The IFR, with its metal-fuel system and pyroprocessing, is able to utilize the actinides to such an extent as to essentially solve the waste problem by reducing the radiological toxicity of the waste products from hundreds of thousands of years to a mere few hundred years. Even if the “million-year problem” of LWR spent fuel is more a political than a technical challenge (given the small volume of the waste stream), nevertheless the issue of public perception of that issue is the one that guides nuclear policy in many countries [14]. As such, the transition to fast reactors and a closed nuclear fuel cycle is both a technical advancement and a political enabler for nuclear power of all kinds.

#### Democrats will use the plan as a bargaining chip to overcome opposition.

Mariah Blake, January/February 2010, is an editor at the Washington Monthly; her work has also appeared in Christian Science Monitor and Foreign Policy, Mother Jones, “The Bailout Goes Nuclear,” <http://www.motherjones.com/environment/2010/01/bailout-nuclear>

Key Senate Democrats have signaled that they are willing to use nuclear subsidies as a bargaining chip to overcome Republican opposition. The Nuclear Energy Institute (NEI), the industry's main lobby, is pushing for at least $100 billion in federal loan guarantees—a dicey proposition given that the Congressional Budget Office has determined that the risk of default would be "well above 50 percent." This raises the question: Will the cost of passing a climate bill be a massive, taxpayer-funded nuclear bailout? The public has rescued the industry once before. The last batch of reactors built in the US during the 1970s and '80s was plagued by a series of boondoggles, one of the most infamous being Long Island's Shoreham Nuclear Power Plant, which took 20 years to build and cost $6 billion—more than 80 times the original estimate—but was never put into commercial operation. Similar debacles pushed utilities into bankruptcy, triggered the largest municipal bond default in US history, and helped cause a sixfold increase in wholesale electricity prices. The total cost to the public, in rate hikes and taxpayer bailouts, was more than $300 billion (in 2006 dollars), according to the Union of Concerned Scientists. Since that time, the industry says it has solved its cost problem, partly by engineering reactors that are simpler and less expensive to build. But the first two next-generation reactors, which are under construction in Finland and France, have been bogged down in multibillion-dollar cost overruns. Meanwhile, the projected cost of building new nuclear plants in the US is soaring: As recently as 2005, the NEI claimed new reactors could be constructed for roughly $2 billion. Newer estimates, including one by Moody's, the credit ratings agency, put the cost as high as $12 billion. That would make nuclear power more expensive on a watt-for-watt basis than most large-scale renewable energy sources, including wind, biomass, and hydropower. No wonder the industry has found it impossible to secure private-sector financing for the 28 reactors that are currently in the pipeline across the nation. Investors "will not accept the economic risk of building new reactors," says Peter Bradford, a former member of the Nuclear Regulatory Commission who is now a professor at Vermont Law School. "There will be no nuclear renaissance beyond what the government is willing to underwrite. "No one understands this better than the industry itself, which is lobbying for a Senate bill to create a Clean Energy Deployment Administration (CEDA) within the Department of Energy (DOE) that would have the authority to award a virtually unlimited number of loan guarantees—without congressional review. "It's a nuclear slush fund," says Michele Boyd, director of Physicians for Social Responsibility's safe energy program, "though the way the bill is written, even many Senate staffers don't know it." The legislation, which is likely to be folded into the climate bill, was sponsored by Sen. Jeff Bingaman (D-N.M.) and crafted with the help of Sen. Lisa Murkowski (R-Alaska). Both lawmakers are top recipients of the nuclear industry's campaign largesse. Under the policy, companies would have to pay an as yet unspecified subsidy fee in order to get loan guarantees, but these payments are all but certain to be dwarfed by the cost of defaults. According to the Union of Concerned Scientists, if 100 new plants are built, as key Republican lawmakers have called for, the price of bad loans could total at least $360 billion—and that's assuming zero cost overruns. The ceda provision builds on the work of Sen. Pete Domenici (R-N.M.), who until his retirement in January 2009 was the Senate's most tireless nuclear crusader. During his reign as chairman of the energy committee from 2003 to 2007, he packed the committee staff with former nuclear-power lobbyists—a clique dubbed "the glow-in-the-dark crew" by some of their Senate colleagues—who shepherded through Congress the Energy Policy Act of 2005. Among other things, the bill provided $13 billion in nuclear subsidies and federal loan guarantees to cover 80 percent of the costs of building low-carbon nuclear technologies, including new reactors. For any other industry, this would have been an enormous victory. But for nuclear, even these generous subsidies weren't enough. In July 2007, six of the nation's largest financial firms—including Citigroup, Lehman Brothers, and Goldman Sachs, companies hardly averse to risky investments—informed the DOE in a letter that nuclear projects would not find financing because they were too chancy. Unless, of course, the agency (which had interpreted the new law to mean 80 percent of project debt) would rewrite the rules so that 100 percent of the debt was covered—foisting almost all of the risk on taxpayers. By the end of 2007, the nuclear lobby had succeeded in getting the DOE to make exactly these changes. But to the industry's dismay, Congress has so far given the DOE authority to distribute $18.5 billion in loan guarantees for nuclear power facilities. That's less than half what UniStar hopes to spend on its four plants, not to mention the needs of the industry at large. So the industry began pushing to increase the funding and simultaneously exempt the program from congressional oversight. Part of NEI's strategy for getting the feds to hand out loan guarantees more freely has been to win over Democrats—who have traditionally been less friendly to nuclear power—by enlisting the help of organized labor. In mid-2008, the group added Michael Mathis and Charles Harple, previously top in-house lobbyists for the International Brotherhood of Teamsters, to its K Street bench. NEI also forged an alliance with the AFL-CIO. At NEI's annual conference in 2008, Mark Ayers, the AFL-CIO's president of Building and Construction Trades, said that in exchange for the industry's commitment to use union labor, his organization would work to "persuade the new majority in Congress about the need for extending and increasing the loan guarantee program." The industry's efforts began to pay off this fall, as nuclear subsidies emerged as the key to wooing Republican votes for a Senate climate bill—votes necessary to offset defections from coal-state Democrats. Since October, Sen. John Kerry (D-Mass.), one of the climate bill's sponsors, has been holding closed-door meetings with Republicans to craft nuclear language. "You listen to the rhetoric around this place and there is no one who will say a disparaging word about nuclear," says a senior Democractic Senate staffer close to the climate bill talks. "They have enough political muscle and enough support across the aisle that I think they will get all the loan guarantees they need."

#### Loan guarantees specifically popular to both sides of the aisle because of lower tax liability.

Sharon Squassoni, November 2009, is a senior associate at the Carnegie Endowment for International Peace in the nonprolifera-tion program. Prior to joining Carnegie, she held various positions in the US government, including at the Congressional research Service, the Arms Control and Disarmament Agency, and the US State Department, is a frequent contributor to journals, magazines and books on nuclear proliferation and defense, The Centre for International Governance Innovation, No. 7, “The US Nuclear Industry: Current Status and Prospects under the Obama Administration,” p. 8, <http://www.carnegieendowment.org/files/Nuclear_Energy_7_0.pdf>

The single most important spur to build new reactors in the United States is loan guarantees. In fact, industry sources indicate they are so critical that new plants may not be built without them. These guarantees are attractive to the US Congress because they offer a way to influence markets and incentivize specific projects, and because they are “scored” as a lower liability for the taxpayer than the actual amount. Thus, a potential US$50 billion in loan guarantees could be scored by the Congressional Budget Office as only costing the taxpayer US$500 million. As originally proposed in the Energy Policy Act (EPACT) of 2005, loan guarantees would only have applied to nuclear power, but this was broadened to apply to a wide range of “innovative energy technologies,” including renewable energy technologies, which further extends their attractiveness within Congress.

#### Nuclear makes it distinct to Congress.

Jim Snyder, 9-14-2012, Bloomberg, “Republican-Led House Passes Bill to Block Energy Loans,” <http://www.bloomberg.com/news/2012-09-14/republican-led-house-passes-bill-to-block-energy-loans.html>

The U.S. House passed legislation to end an energy loan-guarantee program, the culmination of a Republican-led investigation into the collapse of solar-panel maker Solyndra LLC last year. The “No More Solyndras Act,” adopted by a 245-161 vote, wouldn’t immediately halt the loan program. It would prevent the Energy Department from considering applications for government backing submitted since Dec. 31. With $34 billion in loan authority remaining, Democrats said the bill would let nuclear- power projects favored by Republicans go forward.

# 1AR

#### No too slowPyroprocessing technology exists and has been successfully tested.

Barry Brook et. al, 2-21-2009, a leading environmental scientist, holding the Sir Hubert Wilkins Chair of Climate Change at the School of Earth and Environmental Sciences, and is also Director of Climate Science at the University of Adelaide’s Environment Institute, published three books, over 200 refereed scientific papers, is a highly cited researcher, received a number of distinguished awards for his research excellence including the Australian Academy of Science Fenner Medal, is an International Award Committee member for the Global Energy Prize, Australian Research Council Future Fellow, ISI Researcher, Ph.D., Macquarie University in Environmental Engineering, Science Council for Global Initiatives, Edgeworth David Medal Royal Society of NSW, Cosmos Bright Sparks Award, Tom Blees is the author of Prescription for the Planet, the president of the Science Council for Global Initiatives, member of the selection committee for the Global Energy Prize, George S. Stanford is a nuclear reactor physicist, part of the team that developed the Integral Fast Reactor, PhD from Stanford University in Physics, Masters from University of Virginia in Engineering, worked at Argonne National Laboratory, Graham R.L. Cowan, "Boron: A Better Energy Carrier than Hydrogen?" in 2001, published "How Fire Can Be Tamed," BraveNewClimate, “Response to an Integral Fast Reactor (IFR) critique,” <http://bravenewclimate.com/2009/02/21/response-to-an-integral-fast-reactor-ifr-critique/>

[BWB] See above for a comment showing that they (ALMR, pyroprocessing) do exist. Just saying they are fairytales won’t make the reality of them go away. [GS] The problems with fast reactors (‘breeders’) have been non-fundamental. Examples: – The Monju reactor was undamaged by the fire (rated 1 on a scale of 0 to 7, with 7 being the most serious accident), and has been kept shut down for political reasons. I think it has been given the go-ahead to start up. – The EBR-II fast reactor worked flawlessly for many years. – The Phenix fast reactor in France has been on-line for decades. – The Superphenix reactor was shut down for political reasons, after it finally had its problems behind it and was working well. – The Russian BN-600 has been working well for decades.

#### IFR’s are not undeveloped – pyro-processing and integrated reactors are highly developed and used now.

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[BWB] IFRs are sodium-cooled fast spectrum nuclear power stations with on-site pyroprocessing to recycle spent fuel. Fast spectrum power reactors exist — they are not some mythical ‘future tech’ like fusion reactors. Indeed, even sodium-cooled fast reactors (a type of Advanced Liquid Metal Reactor, ALMR), the type an IFR facility would likely use, already exist (others include lead- or gas-cooled). Metallic alloy fuels (uranium-plutonium-zirconium), operating within a reactor, existed, in the Experimental Breeder Reactor II at the Argonne National Laboratory. Just because they are not currently used in any operating nuclear power plant doesn’t mean they don’t (haven’t) existed. The only thing that doesn’t currently exist is the full systems design of the integrated IFR plant. [GS] “Integral” refers to the fact that the fuel processing facility can be an integral part of the IFR plant .…one or another largely undeveloped form of reprocessing/partitioning to separate transuranics (including plutonium) and actinides (long-lived waste) [BWB] Transuranics are actinides — they are not separate things as the above implies. The process of pyroproccesing has already gone through significant technical development, but not commercial-scale demonstration. An excellent, color-illustrated summary, from Scientific American magazine, is available (free download) here. [GS] Transuranics are the elements beyond uranium – that is, their atomic number is 93 or greater: neptunium, plutonium, americium, curium and more. All of them are man-made elements, since they are so radioactive that the naturally created ones have long since decayed away in our little bit of the universe. They are also called higher actinides… An IFR plant will be a “sink” for plutonium: plutonium to be disposed of is shipped in, and there it is consumed, with on-site recycling as needed. Only trace amounts ever come out. [TB] Yes, there will be more (unseparated) Pu involved in the entire process but once inside the door of the IFR it will never leave. With the sort of security and operational framework I propose in my book, it would be far easier to obtain Pu from another source such as a small research reactor. The bottom line is that while the IFR will be more proliferation-resistant than other designs, any time fissile material is used there should be some sort of oversight, even at small research reactors such as those found in many universities around the world. It would be far easier to produce isotopically favorable (for weapons) plutonium at one of them than to extract it from the fuel cycle at an IFR.

#### Fast reactors have been built and successfully tested – multiple examples.

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[TB] The assertion that such reactors don’t exist with the implication that they’re just fantasies on paper is bunk. BN-350 was operational for years starting in 1972. Phenix went online in 1973 and is still running. BN-600 is still running and is the most reliable nuclear reactor in Russia’s system. EBR-II ran for 30 years, FFTF at Hanford for many years too (I don’t recall exactly how many at the moment). Can’t make the fuel? They made thousands of fuel slugs at Argonne Labs over the years. Note the dates: 1972, 1973! And people say that something the French and Soviets built 36 years ago should take another 36 years for us to try? By the way, we will need plenty of desalination plants as our population continues to grow toward 9-10 billion. We don’t have 36 years to drag our feet.

### A2 worker shortage

#### Nuclear industry can absorb lack of immigration – Navy, community colleges – preferred for nuclear expertise.

Kristi E. Swartz, 8-24-2012, “Nuclear industry looks to Navy to fill worker shortage,” AJC, <http://www.ajc.com/news/business/nuclear-industry-looks-to-navy-to-fill-worker-shor/nRMQ9/>

It's a "brain drain" of sorts, but it's one the nuclear power industry has been preparing for. Of the roughly 120,000 workers in the nuclear power industry, nearly 38 percent are eligible to retire within the next five years. For companies like Southern Nuclear, the expected worker shortage comes at a critical time: Southern Nuclear operates six reactors: two at Plant Farley in Alabama and two each at Plant Hatch and Plant Vogtle in Georgia. The company also will operate two new units at Vogtle when they open in 2016 and 2017. "Our issue is a little bit larger than maybe some other utilities," said Steven Kuczynski, chief executive officer for Southern Nuclear. One answer for finding trained workers has been the Navy. About 11 percent of employees at the company's parent, Atlanta-based Southern Co., are military veterans. For the nuclear unit, that percentage is higher, Kuczynski said.¶ "We rely much more heavily on nuclear skills," said Kuczynski, in an interview with The Atlanta Journal-Constitution That Navy-to-nuclear career pipeline was made formal Wednesday after industry leaders met at the Institute of Nuclear Power Operations in Atlanta. Southern Nuclear was one of a dozen nuclear power companies to agree to hire retiring naval personnel with nuclear training. The agreement also expands what's known as the Nuclear Uniform Curriculum Program to let the Navy recruit from 38 community colleges across the country. The idea of the public-private partnership is threefold. Navy veterans with nuclear training have a clear path to a new job. Utilities with nuclear plants have easy access to trained workers. And students at technical schools can start on a career in the nuclear industry by joining the Navy. The agreement formalizes what the industry has been doing for years, said Stephen Trautman, deputy director of the U.S. Navy Nuclear Propulsion Program. "Our folks are routinely highly sought after because of their skills, but this helps them know what opportunities are available in the commercial nuclear business," Trautman said. Georgia Power and South Carolina Electric & Gas Co. are the first two utilities in the United States to win approvals to build new nuclear units from scratch in nearly three decades. But the need for workers stretches beyond that. Utilities operate 104 nuclear reactors in the United States. Engineers, technicians and maintenance workers will be needed to replace retiring employees. "There's a potential for high turnover," because of the retirements, said Randy Edington, executive vice president and chief nuclear officer for Phoenix-based Arizona Public Service Co. The utility operates three reactors including the Palo Verde Nuclear Generating Station, which is the nation's largest reactor. Edington said he's hired 800 employees in the last four years and plans to hire another 800 in the next four. In the meantime, 700 workers have retired. The community colleges and technical schools already have been a training ground for utilities such as Southern Nuclear and its sister company, Georgia Power. The companies recently hired a group of graduates from Augusta Technical College's nuclear engineering technology program to work at the Vogtle 3 and 4 units. Augusta Technical has had about twice as many applicants for its nuclear engineering technology program, which prepares students to work at Vogtle or other nuclear plants. "They are coming in at kind of our entry level and can develop and progress," Kuczynski said. "Our industry has really been built off of this expertise."

### No impact to hege

#### Retrenchment inevitable now – no impact to decline

Joseph M. Parent (Assistant Professor of Political Science at the University of Miami) and Paul K. MacDonald (Assistant Professor of Political Science at Wellesley College) November/December 2011 “The Wisdom of Retrenchment” Foreign Affairs <http://www.ihavenet.com/World-United-States-The-Wisdom-of-Retrenchment-America-Must-Cut-Back-to-Move-Forward-Foreign-Affairs.html>

Today, however, U.S. power has begun to wane. As other states rise in prominence, the United States' undisciplined spending habits and open-ended foreign policy commitments are catching up with the country. Spurred on by skyrocketing government debt and the emergence of the Tea Party movement, budget hawks are circling Washington. Before leaving office earlier this year, Secretary of Defense Robert Gates announced cuts to the tune of $78 billion over the next five years, and the recent debt-ceiling deal could trigger another $350 billion in cuts from the defense budget over ten years. In addition to fiscal discipline, Washington appears to have rediscovered the virtues of multilateralism and a restrained foreign policy. It has narrowed its war aims in Afghanistan and Iraq, taken NATO expansion off its agenda, and let France and the United Kingdom lead the intervention in Libya. But if U.S. policymakers have reduced the country's strategic commitments in response to a decline in its relative power, they have yet to fully embrace retrenchment as a policy and endorse deep spending cuts (especially to the military), redefine Washington's foreign policy priorities, and shift more of the United States' defense burdens onto its allies. Indeed, Secretary of Defense Leon Panetta has warned that a cut in defense spending beyond the one agreed to in the debt-ceiling deal would be devastating. "It will weaken our national defense," he said. "It will undermine our ability to maintain our alliances throughout the world." This view reflects the conventional wisdom of generations of U.S. decision-makers: when it comes to power, more is always better. Many officials fear that reducing the country's influence abroad would let tyranny advance and force trade to dwindle. And various interest groups oppose the idea, since they stand to lose from a sudden reduction in the United States' foreign engagements. In fact, far from auguring chaos abroad and division at home, a policy of prudent retrenchment would not only reduce the costs of U.S. foreign policy but also result in a more coherent and sustainable strategy. In the past, great powers that scaled back their goals in the face of their diminishing means were able to navigate the shoals of power politics better than those that clung to expensive and overly ambitious commitments. Today, a reduction in U.S. forward deployments could mollify U.S. adversaries, eliminate potential flashpoints, and encourage U.S. allies to contribute more to collective defense -- all while easing the burden on the United States of maintaining geopolitical dominance. A policy of retrenchment need not invite international instability or fuel partisan rancor in Washington. If anything, it could help provide breathing room for reforms and recovery, increase strategic flexibility, and renew the legitimacy of U.S. leadership.

### Fine GMO’s it is

#### Organic agriculture is on the rise.

Nancy Cole. "Organic farming a growing field Arkansas man digs deep to promote sustainable methods." Government Innovators Network: Harvard Universtiy John F. Kennedy School of Government. 29 June 2008. http://www.innovations.harvard.edu/news/106451.html

Certified organic farmers cannot use synthetic fertilizers, chemical pesticides, antibiotics, hormones or genetically modified organisms. Instead of depending on nonrenewable resources commonly used by conventional farmers, organic producers rely on ecologically based practices such as biological pest management. “There is an alternative production system that exists out there that works very well,” Kuepper said. “It’s a regenerative system of farming.” To be certified as organic, a farm must be inspected annually by an accredited agent. The agent must certify that the farm is following national organic standards in terms of procedures, substances, monitoring techniques and record-keeping systems. A transition period is required unless records prove that no prohibited substances were used in or near the production area during the previous three years. Organic farming has become one of the fastest-growing segments of U.S. agriculture, experiencing double-digit growth for more than a decade. In 2006 organic food sales totaled $16.7 billion, representing 2.8 percent of total food sales, according to the latest manufacturer survey conducted by the Organic Trade Association. Fruits and vegetables, the largest category, accounted for 40 percent of all organic food sales. To date, organic agriculture has been concentrated on the East and West coasts and in the Upper Midwest. As of 2005, Arkansas had just 21 certified organic farms with a total of 10,441 acres of crop and pastureland. The state’s organic farms produce a smattering of products ranging from milk, rice and vegetables to blueberries, pecans and shiitake mushrooms, said Tim Ellison, director of the state Plant Board’s marketing division. Growth is likely, especially if a more robust organic infrastructure - such as fertilizer and seed suppliers - can be developed, said Craig Andersen, a horticulturist with the University of Arkansas Cooperative Extension Service. Much organic food has been able to command premium prices because of growing consumer concern about the environment and how food is produced. However, that marketing advantage may tend to dissipate as all food prices increase, Andersen said. “Disposable income does have its limits,” he said. On the other hand, organic agriculture may tend to benefit, relative to conventional agriculture, during the current period of soaring fossil fuel and synthetic fertilizer prices, said Kuepper, the sustainable-agriculture specialist.

#### This transition to sustainable practices is key to feed the world.

Laura Bailey. (PhD University of Michigan). "Organic farming can feed the world, U-M study shows." University of Michigan News Service. 10 July 2007. http://www.ns.umich.edu/htdocs/releases/story.php?id=5936

Organic farming can yield up to three times as much food on individual farms in developing countries, as low-intensive methods on the same land—according to new findings which refute the long-standing claim that organic farming methods cannot produce enough food to feed the global population. Researchers from the University of Michigan found that in developed countries, yields were almost equal on organic and conventional farms. In developing countries, food production could double or triple using organic methods, said Ivette Perfecto, professor at U-M's School of Natural Resources and Environment, and one the study's principal investigators. Catherine Badgley, research scientist in the Museum of Paleontology, is a co-author of the paper along with several current and former graduate and undergraduate students from U-M. "My hope is that we can finally put a nail in the coffin of the idea that you can’t produce enough food through organic agriculture," Perfecto said. In addition to equal or greater yields, the authors found that those yields could be accomplished using existing quantities of organic fertilizers, without putting more farmland into production. The idea to undertake an exhaustive review of existing data about yields and nitrogen availability was fueled in a roundabout way, when Perfecto and Badgley were teaching a class about the global food system and visiting farms in Southern Michigan. "We were struck by how much food the organic farmers would produce," Perfecto said. The researchers set about compiling data from published literature to investigate the two chief objections to organic farming: low yields and lack of organically acceptable nitrogen sources. Their findings refute those key arguments, Perfecto said, and confirm that organic farming is less environmentally harmful yet can potentially produce more than enough food. This is especially good news for developing countries, where it’s sometimes impossible to deliver food from outside, so farmers must supply their own. Yields in developing countries could increase dramatically by switching to organic farming, Perfecto said. While that seems counterintuitive, it makes sense because in developing countries, many farmers still do not have the access to the expensive fertilizers and pesticides that farmers use in developed countries to produce those high yields, she said. After comparing yields of organic and non-organic farms, the researchers looked at nitrogen availability. To do so, they multiplied the current farm land area by the average amount of nitrogen available for production crops if so-called "green manures" were planted between growing seasons. Green manures are cover crops which are plowed into the soil to provide natural soil amendments. They found that planting green manures between growing seasons provided enough nitrogen to replace synthetic fertilizers. Organic farming is important because conventional agriculture—which involves high-yielding plants, mechanized tillage, synthetic fertilizers and biocides—is so detrimental to the environment, Perfecto said. For instance, fertilizer runoff from conventional agriculture is the chief culprit in creating dead zones—low oxygen areas where marine life cannot survive. Proponents of organic farming argue that conventional farming also causes soil erosion, greenhouse gas emission, increased pest resistance and loss of biodiversity. For their analysis, researchers defined the term organic as: practices referred to as sustainable or ecological; that utilize non-synthetic nutrient cycling processes; that exclude or rarely use synthetic pesticides; and sustain or regenerate the soil quality. Perfecto said the idea that people would go hungry if farming went organic is "ridiculous." "Corporate interest in agriculture and the way agriculture research has been conducted in land grant institutions, with a lot of influence by the chemical companies and pesticide companies as well as fertilizer companies—all have been playing an important role in convincing the public that you need to have these inputs to produce food," she said.

#### This is key to solve food prices

USA Today. "Food Agency: Prices To Remain High, More Production Needed." June 25, 2008. http://www.usatoday.com/news/world/2008-06-25-food-prices\_N.htm

The head of the U.N.'s food agency on Wednesday warned that food prices will remain high and has called for a boost in production. Food and Agriculture Organization Director-General Jacques Diouf said prices are expected to remain high due climate change, continued demand for bioenergy, low food stocks and greater demand in emerging countries such as China and India. Diouf said the problem will not be solved without increasing food production and called on world leaders meeting in Japan next month to address this issue. "These prices have an impact not only in developing countries ... but also these soaring prices have had an impact on developed countries with an increase in inflation," Diouf told reporters in the Austrian city of Innsbruck.

#### Famine

Charles Ellwood (Professor at the University of Missouri) 2003 "Sociology and Modern Social Problems" http://www.nalanda.nitc.ac.in/resources/english/etext-project/sociology/sociology/chapter9.html

As already implied, then, economic depression exercises a very considerable influence upon death rate, particularly when economic depression causes very high prices for the necessities of life and even widespread scarcity of food. This cause produces far more deaths in modern nations than war. The doubling of the price of bread in any civilized country would be a far greater calamity than a great war. While modern civilized peoples fear famine but little, there are many classes in the great industrial nations that live upon such a narrow margin of existence that the slightest increase in the cost of the necessities of life means practically the same as a famine to these classes. Statistics, therefore, of all modern countries, and particularly of all great cities, show an enormous increase in sickness and death among the poorer classes in times of economic depression.

#### War

Marc J. Cohen (Special Assistant to the Director General at International Food Policy Research Institute) and Per Pinstrup-Andersen (Director General of the International Food Policy Research Institute) Spring 1999 Social Research, http://www.findarticles.com/p/articles/mi\_m2267/is\_1\_66/ai\_54668884/pg\_10

Hunger and conflict usually have roots in colonial legacies and contemporary policies of racial or religious exclusion and political-economic discrimination (Heggenhoughen, 1995); and in struggles over control of strategic resources, such as land, water, trade routes, and petroleum. Sources of discontent include skewed land distribution and discriminatory economic policies that preclude decent standards of living. Unequal access to education and nutrition services and unequal treatment before the law inflame perceptions of unfairness. Human rights abuse based on race, religion, ethnicity, geographic location, political ideology, or occupation rouse animosities. In Central America, civil wars followed protracted food crises and human rights abuses, with demands for land, social justice, and democracy key to the conflicts (MacDonald, 1988; Barraclough, 1989). Tensions ripen into violent conflict especially where economic conditions deteriorate and people face subsistence crises. Hunger causes conflict when people feel they have nothing more to lose and so are willing to fight for resources, political power, and cultural respect. A recent econometric study found that slow growth of food production per capita is a source of violent conflict and refugee flows (Nafziger and Auvinen, 1997). In Ethiopia, Rwanda, and Sudan, governments were finally toppled when they inadequately responded to famine situations they had helped create. Unfortunately, none of these wars immediately improved subsistence conditions; instead, all magnified suffering and food shortages. Hunger spurs conflict in both rural and urban areas. Wolf (1969), Scott (1976), and others have shown the key role of subsistence crises in "peasant wars of the twentieth century" in such places as Mexico, Cuba, Vietnam, and Central America.