# 1AC

### Plan

Plan: The United States Federal Government should substantially increase commercial loan guarantees for purposes of energy production by development for Integral Fast Reactors in the United States.

### Advantage One: Fissile Material

#### Rapid cascade proliferation at the tipping point for causing global nuclear war.

Graham Allison, January/February 2010, Director of Harvard's major Center for Science and International Affairs, as for three decades been a leading analyst of U.S. national security and defense policy with a special interest in nuclear weapons, terrorism, and decision-making, Assistant Secretary of Defense in the first Clinton Administration, Defense Medal for Distinguished Public Service, Organizer of the Commission on America's National Interests, Foreign Policy, “Nuclear Disorder,” Ebsco Host

THE GLOBAL nuclear order today could be as fragile as the global financial order was two years ago, when conventional wisdom declared it to be sound, stable, and resilient. In the aftermath of the 1962 Cuban missile crisis, a confrontation that he thought had one chance in three of ending in nuclear war, U.S. President John F. Kennedy concluded that the nuclear order of the time posed unacceptable risks to mankind. "I see the possibility in the 1970s of the president of the United States having to face a world n which 15 or 20 or 25 nations may have these weapons," he forecast. "I regard that as the greatest possible danger." Kennedy's estimate reflected the general expectation that as nations acquired the advanced technological capability to build nuclear weapons, they would do so. Although history did not proceed along that trajectory, Kennedy's warning helped awaken the world to the intolerable dangers of unconstrained nuclear proliferation. His conviction spurred a surge of diplomatic initiatives: a hot line between Washington and Moscow, a unilateral moratorium on nuclear testing, a ban on nuclear weapons in outer space. Refusing to accept the future Kennedy had spotlighted, the international community instead negotiated various international constraints, the centerpiece of which was the 1968 Nuclear Nonproliferation Treaty (NPT). Thanks to the nonproliferation regime, 184 nations, including more than 40 that have the technical ability to build nuclear arsenals, have renounced nuclear weapons. Four decades since the NPT was signed, there are only nine nuclear states. Moreover, for more than 60 years, no nuclear weapon has been used in an attack. In 2004, the secretary-general of the UN created a panel to review future threats to international peace and security. It identified nuclear Armageddon as the prime threat, warning, "We are approaching a point at which the erosion of the nonproliferation regime could become irreversible and result in a cascade of proliferation." Developments since 2004 have only magnified the risks of an irreversible cascade. The current global nuclear order is extremely fragile, and the three most urgent challenges to it are North Korea, Iran, and Pakistan. If North Korea and Iran become established nuclear weapons states over the next several years, the nonproliferation regime will have been hollowed out. If Pakistan were to lose control of even one nuclear weapon that was ultimately used by terrorists, that would change the world. It would transform life in cities, shrink what are now regarded as essential civil liberties, and alter conceptions of a viable nuclear order. Henry Kissinger has noted that the defining challenge for statesmen is to recognize "a change in the international environment so likely to undermine a nation's security that it must be resisted no matter what form the threat takes or how ostensibly legitimate it appears." The collapse of the existing nuclear order would constitute just such a change and the consequences would make nuclear terrorism and nuclear war so imminent that prudent statesmen must do everything feasible to prevent it.

#### Those who acquire nuclear weapons don’t do it for reasons of security and deterrence – Waltz is wrong.

Christopher Bluth, 7-11-2011, work is in international security, prior to coming to Leeds, I was Professor of International and European Studies at the University of Reading, worked with Sir Lawrence Freedman and Robert O'Neill on the four-nation Nuclear History Programme, before taking up a lectureship in International Relations at the University of Essex, The British Journal of Politics & International Relations, Vol. 14 Issue 1, “The Irrelevance of ‘Trusting Relationships’ in the Nuclear Non-Proliferation Treaty: Reconsidering the Dynamics of Proliferation,” Ebsco Host

If ‘trusting relationships’ are fundamental to the dynamic of the NPT, then the sheer robustness and widespread acceptance of the regime would imply that trust between nations has become almost universal. On the other hand, Wheeler has stated on another occasion that ‘world politics have entered a new age of uncertainty ... whose landscape is shaped by risk, danger, mistrust, fear, uncertain co-operation, doubtful trust and insecurity’ (Booth and Wheeler 2008, 266). If world politics is shaped by ‘doubtful trust’, and ‘trust’ is fundamental to the NPT, then how do we account for the quasi-universal acceptance of the NPT? The fact that nuclear proliferation is rare is particularly puzzling given that nuclear weapons seemingly can resolve a state's security dilemma in one stroke. Nuclear weapons, if Kenneth Waltz, John Mearsheimer and many other realists are to be believed, enable weaker states to balance stronger states (Sagan and Waltz 2003). They deter and prevent armed conflict and guarantee the security of the state that possesses them. Then how can it be that so few states have acquired them? The answer must be that most states do not perceive nuclear weapons as providing the security benefit that is often claimed for them. Ruzicka and Wheeler have not demonstrated that, by forgoing nuclear weapons, states have accepted a ‘vulnerability’vis-à-vis other states. The proposition that the existence of the NPT as an international security regime which is discriminatory in its very design and offers only very weak security assurances to its non-nuclear members has persuaded states to forgo such a powerful means to provide for their security seems prima facie implausible.

#### Central question of the nonproliferation regime is disposal of nuclear fuel not solving will undercut the global nuclear order.

Graham Allison, January/February 2010, Director of Harvard's major Center for Science and International Affairs, as for three decades been a leading analyst of U.S. national security and defense policy with a special interest in nuclear weapons, terrorism, and decision-making, Assistant Secretary of Defense in the first Clinton Administration, Defense Medal for Distinguished Public Service, Organizer of the Commission on America's National Interests, Foreign Policy, “Nuclear Disorder,” Ebsco Host

GROWING CYNICISM about the nonproliferation regime also threatens to undercut the global nuclear order. It is easy to see why non-nuclear-weapons states view the regime as an instrument for the haves to deny the have-nots. At the NPT Review Conference in 2000, the United States and other nuclear weapons states promised to take 13 "practical steps" toward meeting their NPT commitments, but later, at the Review Conference in 2005, John Bolton, then the U.S. ambassador to the UN, declared those 2000 undertakings inoperable and subsequently banned any use of the word "disarmament" from the "outcome document" of the UN's 60th anniversary summit. In preparation for the 2010 Review Conference, which will convene in May, diplomats at the IAEA have been joined by prime ministers and presidents in displaying considerable suspicion about a regime that permits nuclear weapons states to keep their arsenals but prevents others from joining the nuclear club. Those suspicions are reflected in governments' unwillingness to accept additional constraints that would reduce the risks of proliferation, such as by ratifying the enhanced safeguards agreement known as the Additional Protocol or approving an IAEA-managed multinational fuel bank to ensure states access to fuel for nuclear energy plants. At the same time, rising concerns about greenhouse gas emissions have stimulated a growing demand for nuclear energy as a clean-energy alternative. There are currently 50 nuclear energy plants under construction, most of them in China and India, and 130 more might soon be built globally. Concern arises not from the nuclear reactors themselves but from the facilities that produce nuclear fuel and dispose of its waste product. The hardest part of making nuclear weapons is producing fissile material: enriched uranium or plutonium. The same setup of centrifuges that enriches uranium ore to four percent to make fuel for nuclear power plants can enrich uranium to 90 percent for nuclear bombs. A nuclear regime that allows any state with a nuclear energy plant to build and operate its own enrichment facility invites proliferation. The thorny question is how to honor the right of non-nuclear-weapons states, granted by the NPT, to the "benefits of peaceful nuclear technology" without such a consequence.

#### U.S. fast reactors and pyro-processing is key to reinvigorating nuclear leadership – Korea proves.

Charles D. Ferguson, 6-17-2009, is the Philip D. Reed senior fellow for science and technology at the Council on Foreign Relations (CFR), is also an adjunct professor in the security studies program at Georgetown University, where he teaches a graduate-level course titled “Nuclear Technologies and Security,” and an adjunct lecturer in the national security studies program at the Johns Hopkins University, where he teaches a graduate level course titled “Weapons of Mass Destruction Technologies,” served as the project director for the CFR-sponsored Independent Task Force on U.S. Nuclear Weapons Policy, scientist-inresidence at the Monterey Institute’s Center for Nonproliferation Studies (CNS), won the Robert S. Landauer Lecture Award from the Health Physics Society, Testimony to Committee on Science and Technology, U.S. House of Representatives, “Advancing Technology for Nuclear Fuel Recycling: What Should Our Research, Development, and Demonstration Strategy Be?.” <http://www.cfr.org/content/publications/attachments/FergusonTestimonyJune172009.pdf>

The benefit of a fast reactor recycling program could be the reduction or near elimination of the longer-lived transuranic elements that are the major heat producing elements beyond several hundred years. Other countries may venture into reprocessing. Therefore, it is imperative for the United States to reevaluate its policies and redouble its efforts to prevent the further spread of reprocessing plants to non-nuclear-weapon states. In particular, the Republic of Korea is facing a crisis in the overcrowded conditions in the spent fuel pools at its power plants. One option is to remove older spent fuel and place it in dry storage casks, but the ROK government believes this option may cost too much because of the precedent set by the exorbitantly high price paid for a low level waste disposal facility. Another option is for the ROK to reprocess spent fuel. While this will provide significant volume reduction in the waste, it will only defer the problem to storage of MOX spent fuel, similar to the problem faced by France. This option will run counter to the agreement the ROK signed with North Korea in the early 1990s for both states to prohibit reprocessing or enrichment on the Korean Peninsula. A related option is to ship spent fuel to La Hague, but a security question is whether to ship plutonium back to the ROK. France would require shipment of the high level waste back to the ROK. Thus, the ROK will need a high level waste disposal facility. The main reason I raise this ROK issue at length is that the ROK and the United States have recently begun talks on the renewal of their peaceful nuclear cooperation agreement, which will expire in 2014. The United States has consent rights on ROK spent fuel because either it was produced with U.S.-supplied fresh fuel or U.S. origin reactor systems. The ROK is seeking to have future spent fuel not subject to such consent rights by purchasing fresh fuel from other suppliers and by developing reactor systems that do not have critical components that are U.S.-origin or derived from U.S.origin systems. The bottom line is that the United States is steadily losing its leverage with the ROK and other countries because of declining U.S. leadership in nuclear power plant systems and nuclear waste management. Concerning lessons the United States can learn from other countries’ nuclear waste management experience, the first lesson is that a fair political and sound scientific process is essential for selecting a permanent repository. Sweden demonstrates the effectiveness of examining multiple sites and gaining buy-in from the public and local governments. The second lesson is that reprocessing, as currently practiced, does not substantially alleviate the nuclear waste management problem. However, more research is needed to determine the costs and benefits of fast reactors for reducing transuranic waste. Any type of reprocessing will require safe and secure waste repositories. While the United States investigates the costs and benefits of various recycling proposals through a research program, it has an opportunity now to exercise leadership in two waste management areas. First, as envisioned in GNEP, the United States should offer fuel leasing services. As part of those services, it should offer to take back spent fuel from the client countries. (Russia is offering this service to Iran’s Bushehr reactor.) This spent fuel does not necessarily have to be sent to the United States. It could be sent to a third party country or location that could earn money for the spent fuel storage rental service. Spent fuel can be safely and securely stored in dry storage casks for up to 100 years. Long before this time ends, a research program will most likely determine effective means of waste management. The spent fuel leasing could be coupled to the second area where the United States can play a leadership role. That is, the United States can offer technical expertise and political support in helping to establish regional spent fuel repositories.

#### The plan would strengthen tacit bargaining to not proliferate – creates a framework of incentives where it’s in everyone’s collective interest.

Jan Ruzicka & Nicholas J. Wheeler, 1-18-2010, was appointed as Lecturer in Security Studies at Aberystwyth University, worked in the Department as research assistant for the project ‘The Challenges to Trust-Building in Nuclear Worlds,’ Marie Curie doctoral fellow in the Department, served as the chief aide to a ranking member of the Committee on Foreign Affairs, Defence, and Security of the Senate of the Czech Republic, graduate of Charles University in Prague, he received his MA degrees in politics at Brandeis University and in international relations at Central European University, and Nicholas J. Wheeler is professor of international politics at Aberystwyth University and co-editor of the Cambridge Studies in International Relations book series, published by Cambridge University Press and the British International Studies Association, International Affairs, Vol. 86 Issue 1, p. 79-81, Ebsco Host

The nub of the problem is how to preserve the sovereign right of states to enjoy the peaceful benefits of nuclear energy without practising a new discrimination in fuel-cycle capabilities. 33 For even if those states that have not yet developed enrichment and reprocessing facili-ties could be persuaded to rely on external suppliers of fuel, would those that have already crossed the threshold of ‘virtual’ nuclear weapon status be prepared to give up their national control over the fuel-cycle? Just as the NWS argue that the bomb is vital to their security in an uncertain world, so some states view indigenous fuel-cycle capabilities as an insurance against potential adversaries breaking out of the restraints of the NPT, the fear of those nuclear-armed powers outside the treaty and a generalized collapse of the non-proliferation norm. Establishing international controls over the fuel-cycle is a critical challenge in the years ahead. However, it remains to be seen whether those NNWS that are most critical of the failure of the NWS to live up to their promise to disarm can be persuaded to accept constraints on fuel-cycle capabilities in the absence of what the NNWS see as the NWS acting in good faith to honour their obligations under article VI. Even if this were to lead to global zero, there remains the question whether the current NNWS would accept a global nuclear order that froze them into a permanent inferiority vis-à-vis nuclear suppliers who would also have the ultimate leverage of reconstituting their arsenals. George Perkovich and James Acton are right in recognizing that the issue of ‘nuclear equity’ is a major barrier to a future bargain of this kind. They argue that ‘the most acceptable alternative would be to move towards a standard whereby only multinational facilities were allowed everywhere’. 34 But such an ambitious proposal still leaves unanswered the concerns about hedging both inside and outside the treaty. Movement towards a new and far-reaching bargain might seem to require that one of the parties take a leap of trust by accepting substantially greater vulnerability. 35 This is one of the possibilities, but it is unlikely that governments will act in this manner. There is another possibility, which builds on the fact that the signatories of the NPT have already accepted a significant degree of vulner-ability by entering into the treaty in the first place. This alternative rests on one or both parties taking a series of steps that would strengthen the trusting relationship between the NWS and the NNWS. 36 It is at this point that our reinterpretation of the NPT as embodying a set of trusting relationships opens up new ways to think about nuclear non-proliferation policy. If states realize that they have already entered a trusting relationship with other signatories, the actions required to revitalize the grand bargain do not appear as risky as sceptics might suggest. The new bargain could be defended as advan-tageous in terms of pay-offs for both the NWS and the NNWS, exhibiting the intersection of particular interests and the collective interest in non-proliferation. Notwithstanding the pay-offs providing an incentive to enter into the extended bargain (the rationalist approach to trust), a trusting relationship also requires that all parties have good grounds to think that others will do what is right (the binding approach to trust). Establishing the necessary confidence among the signatories that the bargain can be revitalized in the manner set out above would be significantly helped by all NPT states living up to the promises they have made, by a willingness on the part of all signatories to uphold and enforce the norms on which the treaty stands, and by a recognition that trusting relationships are already in place. Historical legacies, feelings of betrayal on all sides—especially on the part of the NNWS— and questioning of others’ motives and integrity create formidable obstacles to strengthening the trusting relationships. What is crucial is that these obstacles do not rule out the possibility of reversing the erosion of trust in the original bargain of the treaty. The fact that the states that have signed up to the treaty argue over each other’s trustworthiness suggests that there is more space for trust than is generally recognized. The steps that are necessary to build trusting relationships both open up and depend on the possibility of new pay-offs as well as mutual bonds. Building trust among the NWS The lack of progress towards nuclear disarmament on the part of the NWS is probably the most contentious sticking point between the signatories of the NPT. The nuclear-armed powers have at best exercised the ‘radical’ rhetoric of admit-ting that they would consider moving towards nuclear disarmament if only the other members of the nuclear club made the first move. Their behaviour is testa-ment to the present limits of their trusting relationship. Which actions and policies could lead to the extension of these limits? Following the end of the Cold War, the context for thinking about nuclear disarmament changed from the bilateral relationship between the United States and the Soviet Union to a more complex web of relationships between the five recognized nuclear powers. Nevertheless, given the enormous size of their nuclear arsenals, the US and Russia still hold the key to strengthening trusting relation-ships among the NWS and ultimately moving towards nuclear disarmament.

#### Counterplan cards and reprocessing turns don’t apply – brain drain, new capacity.

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. Current reprocessing techniques make spent fuel attractive for rapid proliferation – low radiation levels and easy reaction.

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. 6-7, <http://humanities.uchicago.edu/orgs/institute/bigproblems/Team7-1210.pdf>

Another pressing concern to consider is the fear of nuclear proliferation. While the uranium separated in the PUREX process is both highly radioactive and lowly enriched making it relatively useless in the production of nuclear weaponry, the plutonium is almost exclusively the fissile Pu-239 isotope. This isotope is radioactive, but only emits alpha radiation, making it safe to handle. Furthermore, due to higher neutron production in a fission cross section of plutonium, a lower critical mass is required to produce a sustained chain reaction. Although one would still require considerable resources to create a nuclear weapon using this plutonium, it is nevertheless a real cause for concern, unlike the reactor grade uranium. A portion of this plutonium is generally converted to mixed-oxide fuel or “MOX”, a combination of plutonium and either spent or reprocessed uranium isotopes that behaves similarly to LEU. However, the ratio of converted plutonium to stored plutonium is surprisingly low. For example, according to an Institute for Energy and Environmental Research (IEER) quoted statistic, in 1995 17 metric tons of plutonium were separated in civilian reprocessing plants, of which 8 metric tons were fabricated into MOX while the rest was stored. The largest collective civilian plutonium inventories are France with 55 metric tons, the UK with 49 metric tons, and Russia with around 30 metric tons.6 While none of this plutonium has been reported lost or stolen, its existence alone remains a threat to nuclear proliferation.

#### IFR’s makes it impossible for terrorists to steal fissile material – too hot to handle and mixed materials.

Charles Till, 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, FRONTLINE PBS, “NUCLEAR REACTION Why do Americans Fear Nuclear Power,” <http://www.pbs.org/wgbh/pages/frontline/shows/reaction/interviews/till.html>

The object in the IFR demonstration was to invent, if you like, a process that did not allow separations of pure plutonium that would be necessary for weapons. In order to recycle, you need some kind of a chemical process. And the chemical process that was invented here at Argonne used quite different principles than present processes do. It allows the separation of that group of things that are useful, but not one from the other, so that you cannot separate plutonium purely from uranium and the other things. You can separate uranium, plutonium, and the other useful things from the fission products. So it does exactly what you want it to do. It gives you the new fuel, and it separates off the waste product, but it doesn’t allow careful distinguishing between the materials that are useful, such that you could use one or another of those materials for weapons. Q: So it would be very difficult to handle for weapons, would it? A: It’s impossible to handle for weapons, as it stands. It’s highly radioactive. It’s highly heat producing. It has all of the characteristics that make it extremely, well, make it impossible for someone to make a weapon. Q: The argument most put on the Senate floor was that the IFR increases the risks of proliferation. A: Yes. Well, it doesn’t. As simply as that. There’s no technical reason why one would make that argument. In order to produce weapons, you have to produce pure plutonium. The IFR process will not do that. The only possible argument that would hold any water whatsoever was that when showing people that plutonium is not the demon substance that it’s been advertised as being, that, in fact, it’s quite a workaday material, that in some way or other, the familiarity of it could be used to say that it doesn’t hold the terrors that it’s supposed to hold, and so, perhaps, more tempting in some way for someone to try to misuse it. But I mean, that’s a far-out kind of argument, it seems to me, compared to the unquestioned benefits from simply using this stuff to produce energy. Q: But they were arguing that this made the world less safe. Would you say the opposite, or what? A: No, I would say completely the opposite. Modern society runs on energy. This gives a wonderful, clean form of energy. Its possibility for misuse for weapons goes against the history of the development of nuclear energy over the last 50 years. If weapons are going to be produced, they’re going to be produced by making plutonium in facilities that specifically make weapons-grade plutonium, because that’s the kind that the weapon designer needs. The IFR doesn’t do that.

#### Expansion of unsafe status quo reprocessing techproduces a multiplier effect for nuclear theft.

John Deutch & Ernest Moniz, 2003, CO CHAIR Institute Professor Department of Chemistry, MIT, and Ernest Moniz a co-chair in the Department of Physics, MIT Director of Energy Studies, Laboratory for Energy and the Environment, The Future of Nuclear Power – an interdisciplinary MIT Study, The Future of Nuclear Power: An Interdisciplinary MIT Study, “Chaired Effort to Identify Barriers and Solutions for Nuclear Option in Reducing Greenhouse Gases,” <http://web.mit.edu/nuclearpower/>

In addition to the risk of nuclear weapons capability spreading to other nations, the threat of acquisition of a crude nuclear explosive by a sub-national group has arisen in the aftermath of the September 11, 2001 terrorist attacks. The report of interest in nuclear devices by the terrorist Al Qaeda network especially highlights this risk. Terrorist or organized crime groups are not expected to be able to produce nuclear weapons material themselves; the concern is their direct acquisition of nuclear materials by theft or through a state sponsor. This places the spotlight on the PUREX/MOX fuel cycle as currently practiced in several countries, since the fuel cycle produces during conventional operation nuclear material that is easily made usable for a weapon. The sub-national theft risk would be exacerbated by the spread of the PUREX/MOX fuel cycle, particularly to those countries without the infrastructure for assuring stringent control and accountability.

#### 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.

#### Impact is 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

### Advantage Two: Climate

#### Pyro-processing is key to stop climate change we’re close to the tipping point.

Steve Kirsch, 11-25-2009, 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, “Why We Should Build an Integral Fast Reactor Now,” <http://skirsch.wordpress.com/2009/11/25/ifr/>

\*\*\*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\*\*\*

To prevent a climate disaster, we must eliminate virtually all coal plant emissions worldwide in 25 years. The best way and, for all practical purposes, the only way to get all countries off of coal is not with coercion; it is to make them want to replace their coal burners by giving them a plug-compatible technology that is less expensive. The IFR can do this. It is plug-compatible with the burners in a coal plant (see Nuclear Power: Going Fast). No other technology can upgrade a coal plant so it is greenhouse gas free while reducing operating costs at the same time. In fact, no other technology can achieve either of these goals. The IFR can achieve both. The bottom line is that without the IFR (or a yet-to-be-invented technology with similar ability to replace the coal burner with a cheaper alternative), it is unlikely that we’ll be able to keep CO2 under 450 ppm. Today, the IFR is the only technology with the potential to displace the coal burner. That is why restarting the IFR is so critical and why Jim Hansen has listed it as one of the top five things we must do to avert a climate disaster.[4] Without eliminating virtually all coal emissions by 2030, the sum total of all of our other climate mitigation efforts will be inconsequential. Hansen often refers to the near complete phase-out of carbon emissions from coal plants worldwide by 2030 as the sine qua non for climate stabilization (see for example, the top of page 6 in his August 4, 2008 trip report). To stay under 450ppm, we would have to install about 13,000 GWe of new carbon-free power over the next 25 years. That number was calculated by Nathan Lewis of Caltech for the Atlantic, but others such as Saul Griffith have independently derived a very similar number and White House Science Advisor John Holdren used 5,600 GWe to 7,200 GWe in his presentation to the Energy Bar Association Annual Meeting on April 23, 2009. That means that if we want to save the planet, we must install more than 1 GWe per day of clean power every single day for the next 25 years. That is a very, very tough goal. It is equivalent to building one large nuclear reactor per day, or 1,500 huge wind turbines per day, or 80,000 37 foot diameter solar dishes covering 100 square miles every day, or some linear combination of these or other carbon free power generation technologies. Note that the required rate is actually higher than this because Hansen and Rajendra Pachauri, the chair of the IPCC, now both agree that 350ppm is a more realistic “not to exceed” number (and we’ve already exceeded it). Today, we are nowhere close to that installation rate with renewables alone. For example, in 2008, the average power delivered by solar worldwide was only 2 GWe (which is to be distinguished from the peak solar capacity of 13.4GWe). That is why every renewable expert at the 2009 Aspen Institute Environment Forum agreed that nuclear must be part of the solution. Al Gore also acknowledges that nuclear must play an important role. Nuclear has always been the world’s largest source of carbon free power. In the US, for example, even though we haven’t built a new nuclear plant in the US for 30 years, nuclear still supplies 70% of our clean power!

#### Solving electricity is the first step to solve climate change because without nuclear power warming is inevitable.

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/>

[TB] Almost 80% of greenhouse gas emissions come from nuclear-capable countries anyway, so even if we just deployed them there we could make tremendous strides, though it would still be wise to create some sort of international oversight organization as I propose in the book. [BWB] This is at best grossly disingenuous (not to mention insulting to call Kirsch stupid). You need to solve the electricity carbon problem to fix the vehicular fuels problem, space heating and embedded energy in building and manufactured goods, and Tom has a solution for MSW [municipal solid waste] also. About half of agricultural emissions can also be solved if you have a zero-carbon energy source. Then you just need to worry about the ruminant methane and carbon from deforestation. But the bottom line is, if you fix electricity, everything else will quicktly start to fall into place. If we don’t stop coal in places like China and India, we’re hosed, irrespective of what we might do in the US and Oz (and even if we could do with without advanced nuclear, which we very likely cannot). I do wonder, what is Jim Green’s plan is for replacing the 484 GW of coal-fired power stations already installed in China, and the further 200 or so plants in the planning or construction pipeline?

#### Electricity demands are rising.

John Deutch & Ernest Moniz, 2003, CO CHAIR Institute Professor Department of Chemistry, MIT, and Ernest Moniz a co-chair in the Department of Physics, MIT Director of Energy Studies, Laboratory for Energy and the Environment, The Future of Nuclear Power – an interdisciplinary MIT Study, The Future of Nuclear Power: An Interdisciplinary MIT Study, “Chaired Effort to Identify Barriers and Solutions for Nuclear Option in Reducing Greenhouse Gases,” <http://web.mit.edu/nuclearpower/>

The U.S. National Academy of Engineering named electrification as the premier engineering achievement of the twentieth century3. This is a remarkable statement for the century of lasers, computers, airplanes, and other ubiquitous and important technologies and is indicative of the extraordinary impact of electricity in improving the quality of people’s lives. Accordingly, it should not be surprising that global electricity use is expected to increase dramatically in the years ahead, even taking into account improvements in end use efficiency. Growth in electricity use is expected especially in developing countries, as they strive to meet basic needs and to modernize and industrialize their economies. The U.S. Department of Energy’s EIA projects a 75% increase in global electricity use in two decades, from 2000 to 2020. By mid-century, a threefold increase or more is credible and, indeed, expected. Table 2.1 gives the growth rate for electricity use in different regions of the world as anticipated in the EIA “business-asusual” projections to the year 2020.4 There is a strong correlation between electricity consumption per capita and the United Nations “human development index” (HDI), which combines indicators of health, education, and economic prosperity.5 Industrialized countries have an HDI above 0.9 (on a scale of 0 to 1) and per capita energy consumption above 4000 kWe-hrs. Large developing countries, such as China, India, Pakistan, and Indonesia, are well below the industrialized country HDI and aspire to advance by rapid economic growth. Overall, energy consumption per capita in the developing world is currently less than a fifth of that in the developed world. Unless provided with assistance or incentives, these developing nations are likely to seek the lowest cost supply alternatives that can meet their growing industrial and consumer demand for electricity. This prospect clearly raises the specter of substantially increased greenhouse gas emissions, since coal is likely to be an economic choice for many developing countries, e.g. China and India. How these developing countries meet their electricity demand is of central interest to the discussion of global warming, since over time their choices will influence global emissions levels more than measures taken by the developed world. Greater electricity consumption is desirable because it accompanies social and economic advance, but we want the electricity production to take place in an economic and environmentally acceptable manner. The attractiveness of nuclear power as an option will be determined by many countryspecific factors. To understand how much nuclear power would be needed to make a significant contribution to reducing CO2 emissions by 2050, and where it might be deployed, we present, in Appendix 2, a simple scenario for electricity growth over the next fifty years.

#### Nuclear power is the most economic source of base-load power it’s key to solve GHG emissions by displacing pollutants.

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/>

Nuclear power is not only commercially competitive, but extremely safe (no coal miners dying), no air pollution at all, no greenhouse gas emissions (such as carbon-dioxide). Nuclear-plant lifetime is being doubled from 30 to 60 years (which utilities, investors, and ratepayers appreciate). If Lovins had his way 30 years ago, considerably more particulates and gases would have been vented to the local and regional atmosphere from coal-fired plants (aside from the greenhouse gases emitted). 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.

#### Nuclear power is needed before renewables, it’s the jumpstart for new clean energy leadership – scientific consensus.

Steve Kirsch, 11-25-2009, 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, “Why We Should Build an Integral Fast Reactor Now,” <http://skirsch.wordpress.com/2009/11/25/ifr/>

\*\*\*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\*\*\*

Nuclear can be installed very rapidly; much more rapidly than renewables. For example, about two thirds of the currently operating 440 reactors around the world came online during a 10 year period between 1980 and 1990. So our best chance of meeting the required installation of new power goal and saving the planet is with an aggressive nuclear program. Unlike renewables, nuclear generates base load power, reliably, regardless of weather. Nuclear also uses very little land area. It does not require the installation of new power lines since it can be installed where the power is needed. However, even with a very aggressive plan involving nuclear, it will still be extremely difficult to install clean power fast enough. Unfortunately, even in the US, we have no plan to install the clean power we need fast enough to save the planet. Even if every country were to agree tomorrow to completely eliminate their coal plant emissions by 2030, how do we think they are actually going to achieve that? There is no White House plan that explains this. There is no DOE plan. There is no plan or strategy. The deadlines will come and go and most countries will profusely apologize for not meeting their goals, just like we have with most of the signers of the Kyoto Protocol today. Apologies are nice, but they will not restore the environment. We need a strategy that is believable, practical, and affordable for countries to adopt. The IFR offers our best hope of being a centerpiece in such a strategy because it is the only technology we know of that can provide an economically compelling reason to change. At a speech at MIT on October 23, 2009, President Obama said “And that’s why the world is now engaged in a peaceful competition to determine the technologies that will power the 21st century. … The nation that wins this competition will be the nation that leads the global economy. I am convinced of that. And I want America to be that nation, it’s that simple.” Nuclear is our best clean power technology and the IFR is our best nuclear technology. The Gen IV International Forum (GIF) did a study in 2001-2002 of 19 different reactor designs on 15 different criteria and 24 metrics. The IFR ranked #1 overall. Over 242 experts from around the world participated in the study. It was the most comprehensive evaluation of competitive nuclear designs ever done. Top DOE nuclear management ignored the study because it didn’t endorse the design the Bush administration wanted. The IFR has been sitting on the shelf for 15 years and the DOE currently has no plans to change that. How does the US expect to be a leader in clean energy by ignoring our best nuclear technology? Nobody I’ve talked to has been able to answer that question. We have the technology (it was running for 30 years before we were ordered to tear it down). And we have the money: The Recovery Act has $80 billion dollars.

#### Anthropogenic warming causes extinction – mitigating coal in the electric power industry is key to solve.

Mudathir F. Akorede et. al, June 2012, M.Eng degree at Bayero University Kano in Electrical Engineering, tutelage engineer in the Chad Basin Development Authority’s, lectureship appointment in the Department of Electrical Engineering, University of Ilorin, professional engineer with the Council for Regulation of Engineering in Nigeria (COREN), reviewer for a number of reputable international journals, Hashim Hizam, Department of Meterology and Atmospheric Sciences, faculty, University of Putra Malaysia, M.Sc in Electrical Engineering, Polytechnic University of Brooklyn, New York, M. Z. A. Ab Kadir and I. Aris, Department of Electrical and Electronics Engineering, Faculty of Engineering University Putra Malaysia, S.D. Buba professor of Climatology University of Putra Malaysia, Ph.D. paleoclimatology, University of Oxford, M.Eng at the University of Putra Malaysia, Renewable & Sustainable Energy Reviews, Vol. 16 Issue 5, “Mitigating the anthropogenic global warming in the electric power industry,” p. 1, Ebsco Host

One of the most current and widely discussed factors that could lead to the ultimate end of man’s existence and the world at large is global warming. Global warming, described as the greatest environmental challenge in the 21st century, is the increase in the average global air temperature near the surface of the Earth, caused by the gases that trap heat in the atmosphere called greenhouse gases (GHGs). These gases are emitted to the atmosphere mostly as a result of human activities, and can lead to global climate change. The economic losses arising from climate change presently valued at $125 billion annually, has been projected to increase to $600 billion per year by 2030, unless critical measures are taken to reduce the spate of GHG emissions. Globally, the power generation sector is responsible for the largest share of GHG emissions today. The reason for this is that most power plants worldwide still feed on fossil fuels, mostly coal and consequently produce the largest amount of CO2 emitted into the atmosphere. Mitigating CO2 emissions in the power industry therefore, would significantly contribute to the global efforts to control GHGs. This paper gives a brief overview of GHGs, discusses the factors that aid global warming, and examines the expected devastating effects of this fundamental global threat on the entire planet. The study further identifies the key areas to mitigate global warming with a particular focus on the electric power industry.

#### Anthropogenic warming is real and has a scientific consensus.

John W. Farley, July/August 2008, is a professor in the department of physics and astronomy at the University of Nevada, Las Vegas, where he has won several awards for distinguished teaching, Monthly Review: An Independent Socialist Magazine, Vol. 60 Issue 3, “The Scientific Case for Modern Anthropogenic Global Warming,” p. 88, Ebsco Host

Anthropogenic global warming is based on very solid science. The discussion in the scientific climate change community is about how much anthropogenic global warming is occurring, but not about whether or not anthropogenic global warming is happening at all. The contrarian arguments raised by Alexander Cockburn lack scientific validity. This is not to say that Cockburn and other skeptics should not have raised some of the questions they have. Science demands constant scru-tiny and the misuse of science, when it occurs, is everyone’s concern. But it is also important to recognize a truth when it has been estab-lished. The verdict is in. Modern global warming stemming to a consid-erable extent from anthropogenic causes is real and constitutes a seri-ous threat to life on the planet as we know it. It is time to stop debating its reality and to do something about it, while there is still time.

#### Even if there is only a one percent chance fast reactors can work you vote aff because the planet is at stake.

Steve Kirsch, 11-25-2009, 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, “Why We Should Build an Integral Fast Reactor Now,” <http://skirsch.wordpress.com/2009/11/25/ifr/>

\*\*\*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\*\*\*

Even if you believe all the arguments of the opposition and completely discount the arguments of the Argonne scientists who best know the technology, it doesn’t matter because we do not have an option: we have to make this work now. Renewables alone can’t kill coal in the time allotted. The point is:1) virtually every credible renewable expert agrees we cannot reduce our carbon emissions enough without nuclear, 2) the IFR is our best nuclear, 3) the IFR is the only technology we have with a realistic chance of replacing coal burners in a coal plant with a lower-cost carbon-free alternative. So objections noted, but our planet is at stake and we have got to make this work. We should be joining together and doing things that our most credible scientists tell us we have to do to save our planet, rather than arguing amongst ourselves and debating what the optimum solution is. The time for debate is over. We are so late on deploying clean energy technologies that any new technology that has a realistic potential to make a significant positive impact should be welcomed with open arms by every human being. Urgency “Within the next four decades, human civilization must eliminate its use of fossil fuels and replace them with 10,000 gigawatts of reliable, sustainable power. The only realistic way that this extraordinary challenge can be met is with the rapid and large-scale deployment of nuclear power, on a worldwide basis, led by countries like the US, Russia, the EU, China and India. Generation III nuclear plants will be critical to this expansion over the short term, Generation IV technology is the astoundingly attractive long-term prospect, with the IFR being the flagship Gen IV design. The urgency in getting the IFR commercialised and deployment on an industrial scale cannot be overstated”.

#### Anthropogenic warming causes rapid sea level rise and a collapse in biodiversity.

Kathy J. Willis et. al, 2010, holds the Tasso Leventis Chair of Biodiversity, is Director of the Biodiversity Institute (BIO) in the Zoology Department and a Professorial Fellow at Merton College, Ph.D. from the University of Cambridge in Plant Sciences, held a Selwyn College Research Fellowship and then a NERC Postdoctoral Fellowship in the department of Plant Sciences, University of Cambridge, Royal Society University Research Fellowship in the Godwin Institute for Quaternary Research, University of Cambridge, University Lectureship in the School of Geography and the Environment, University of Oxford, Keith D. Bennett is a professor in the School of Geography, Archaeology and Palaeoecology at Queen’s University, Belfast, Professor of Late-Quaternary Environmental Change, Responsible for Quaternary Geology program, Senior Assistant in Research at the University of Cambridge, NSERC Postdoctoral Research Fellow, University of Toronto, Shonil A. Bhagwat has a D.Phil. in Tropical Forest Diversity and Conservation and MSc in Forestry and its Relation to Land Use from the University of Oxford, Senior Research Fellow, Course Director BCM, co-ordinating a project that examines Human Adaptation to Biodiversity Change, and John B. Birks professor in the Department of Biology and Bjerknes Centre for Climate Research University of Bergen, editorial boards of Review of Palaeobotany and Palynology; Palaeogeography, Palaeoclimatology, and Palaeoecology; Grana; Journal of Paleolimnology; Acta Palaeobotanica; Journal of Biogeography; Ecology and Plant Diversity, and Perspectives in Plant Ecology, and Evolution, Systematics and Biodiversity, Vol. 8 Issue 1, “4 ◦ C and beyond: what did this mean for biodiversity in the past?,” p. 3, Ebsco Host

Of the many predictions for climate change in the next cen-tury, a general consensus is emerging that global tempera-tures will increase by 2–4 ◦ C and possibly beyond (Mein-shausenet al., 2009), sea levels will rise (1m±0.5 m), and atmospheric CO2 will increase by up to 1000 ppmv (Solomonet al., 2007). It is also widely suggested that the magnitude and rate of these changes will result in many plants and animals going extinct, for example within the next century, over 35% of some biota will have gone ex-tinct (Thomaset al., 2004; Solomonet al., 2007) and there will be extensive die-back of the tropical rainforest due to climate change (e.g. Huntingford et al., 2008). These predictions, based predominantly on models constructed using the present-day static distribution of species in rela-tion to present-day climate, paint a depressing picture. And it is these predictions that pervade the scientific and non-scientific literature to highlight the potential perils of future climate change and leading to the oft-cited sentiment that future climate change poses an equal or greater extinction threat to global biodiversity than land-use change (Parme-san & Yohe, 2003; Thomaset al., 2004).

#### Biodiversity loss causes extinction.

Ruth Young, 2-9-2010, Ph.D. specialising in coastal marine ecology, “Biodiversity: what it is and why it’s important,” <http://www.talkingnature.com/2010/02/Biodiversity/Biodiversity-what-and-why/>

Different species within ecosystems fill particular roles, they all have a function, they all have a niche. They interact with each other and the physical environment to provide ecosystem services that are vital for our survival. For example plant species convert carbon dioxide (CO2) from the atmosphere and energy from the sun into useful things such as food, medicines and timber. A bee pollinating a flower (Image: ClearlyAmbiguous Flickr) Pollination carried out by insects such as bees enables the production of ⅓ of our food crops. Diverse mangrove and coral reef ecosystems provide a wide variety of habitats that are essential for many fishery species. To make it simpler for economists to comprehend the magnitude of services offered by Biodiversity, a team of researchers estimated their value – it amounted to $US33 trillion per year. “By protecting Biodiversity we maintain ecosystem services” Certain species play a “keystone” role in maintaining ecosystem services. Similar to the removal of a keystone from an arch, the removal of these species can result in the collapse of an ecosystem and the subsequent removal of ecosystem services. The most well known example of this occurred during the 19th century when sea otters were almost hunted to extinction by fur traders along the west coast of the USA. This led to a population explosion in the sea otters’ main source of prey, sea urchins. Because the urchins graze on kelp their booming population decimated the underwater kelp forests. This loss of habitat led to declines in local fish populations. Sea otters are a keystone species once hunted for their fur (Image: Mike Baird) Eventually a treaty protecting sea otters allowed the numbers of otters to increase which inturn controlled the urchin population, leading to the recovery of the kelp forests and fish stocks. In other cases, ecosystem services are maintained by entire functional groups, such as apex predators (See Jeremy Hance’s post at Mongabay). During the last 35 years, over fishing of large shark species along the US Atlantic coast has led to a population explosion of skates and rays. These skates and rays eat bay scallops and their out of control population has led to the closure of a century long scallop fishery. These are just two examples demonstrating how Biodiversity can maintain the services that ecosystems provide for us, such as fisheries. One could argue that to maintain ecosystem services we don’t need to protect Biodiversity but rather, we only need to protect the species and functional groups that fill the keystone roles. However, there are a couple of problems with this idea. First of all, for most ecosystems we don’t know which species are the keystones! Ecosystems are so complex that we are still discovering which species play vital roles in maintaining them. In some cases its groups of species not just one species that are vital for the ecosystem. Second, even if we did complete the enormous task of identifying and protecting all keystone species, what back-up plan would we have if an unforseen event (e.g. pollution or disease) led to the demise of these ‘keystone’ species? Would there be another species to save the day and take over this role? Classifying some species as ‘keystone’ implies that the others are not important. This may lead to the non-keystone species being considered ecologically worthless and subsequently over-exploited. Sometimes we may not even know which species are likely to fill the keystone roles. An example of this was discovered on Australia’s Great Barrier Reef. This research examined what would happen to a coral reef if it were over-fished. The “over-fishing” was simulated by fencing off coral bommies thereby excluding and removing fish from them for three years. By the end of the experiment, the reefs had changed from a coral to an algae dominated ecosystem – the coral became overgrown with algae. When the time came to remove the fences the researchers expected herbivorous species of fish like the parrot fish (Scarus spp.) to eat the algae and enable the reef to switch back to a coral dominated ecosystem. But, surprisingly, the shift back to coral was driven by a supposed ‘unimportant’ species – the bat fish (Platax pinnatus). The bat fish was previously thought to feed on invertebrates – small crabs and shrimp, but when offered a big patch of algae it turned into a hungry herbivore – a cow of the sea – grazing the algae in no time. So a fish previously thought to be ‘unimportant’ is actually a keystone species in the recovery of coral reefs overgrown by algae! Who knows how many other species are out there with unknown ecosystem roles! In some cases it’s easy to see who the keystone species are but in many ecosystems seemingly unimportant or redundant species are also capable of changing niches and maintaining ecosystems. The more Biodiversityiverse an ecosystem is, the more likely these species will be present and the more resilient an ecosystem is to future impacts. Presently we’re only scratching the surface of understanding the full importance of Biodiversity and how it helps maintain ecosystem function. The scope of this task is immense. In the meantime, a wise insurance policy for maintaining ecosystem services would be to conserve Biodiversity. In doing so, we increase the chance of maintaining our ecosystem services in the event of future impacts such as disease, invasive species and of course, climate change. This is the international year of Biodiversity – a time to recognize that Biodiversity makes our survival on this planet possible and that our protection of Biodiversity maintains this service.

### Solvency

#### Fast reactors are 100% safe – multiple redundancies eliminating human error and impregnable\*\*

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] The laws of physics say that this is not nonsense. For instance, the metal fuel pins’ composition is such that if they begin to overheat, the resulting expansion decreases their density to the point where the fission reaction simply shuts down. This is not speculation — it’s been tested and verified. I quote: “The IFR gains safety advantages through a combination of metal fuel (an alloy of uranium, plutonium, and zirconium), and sodium cooling. By providing a fuel which readily conducts heat from the fuel to the coolant, and which operates at relatively low temperatures, the IFR takes maximum advantage of expansion of the coolant, fuel, and structure during off-normal events which increase temperatures. The expansion of the fuel and structure in an off-normal situation causes the system to shut down even without human operator intervention. In April of 1986, two special tests were performed on the Experimental Breeder Reactor II (EBR-II), in which the main primary cooling pumps were shut off with the reactor at full power (62.5 Megawatts, thermal) – By not allowing the normal shutdown systems to interfere, the reactor power dropped to near zero within about 300 seconds. No damage to the fuel or the reactor resulted. This test demonstrated that even with a loss of all electrical power and the capability to shut down the reactor using the normal systems, the reactor will simply shut down without danger or damage. The same day, this demonstration was followed by another important test. With the reactor again at full power, flow in the secondary cooling system was stopped. This test caused the temperature to increase, since there was nowhere for the reactor heat to go. As the primary (reactor) cooling system became hotter, the fuel, sodium coolant, and structure expanded, and the reactor shut down. This test showed that an IFR type reactor will shut down using inherent features such as thermal expansion, even if the ability to remove heat from the primary cooling system is lost. Events such as the loss of water to the steam system would cause a condition such as the test demonstrated. Another major feature of the IFR concept is that the reactor uses a coolant, sodium, which does not boil during normal operation nor even in overpower transients such as described above. This means that the coolant is not under significant pressure. When coolant is not under pressure, the reactor can be placed in a “pool” of coolant, contained in a double tank, so that there is no real possibility for a loss of coolant. Even if the normal pumps are lost, some coolant flow through the reactor occurs due to natural convection. The features described above allow for greater simplification of a nuclear plant, resulting in cost savings, greater ease in operation, and a safety system that relies on natural phenomenon that cannot be defeated by human error. “ [TB] Arguing that these reactors cannot be safe from meltdowns flies in the face of the laws of physics, which assure that very feature. Regarding terrorist attack, we can secure our airports chemical plants, etc, with not a lot of work, you can design these plants to be virtually impregnable by terrorists (e.g., burying the reactor building). The new Gen III LWRs, though, are so far advanced as to merit their designation as a different generation. The probabilistic risk assessment of the ESBWR is astronomical, one core melt accident every 29 million reactor-years. Since we don’t have enough nuclear waste to load new IFRs quickly enough to meet the 2050 goal of zero emissions, the newest LWRs could be built to fill any gap that renewables and IFRs couldn’t fill and can be expected to perform safely. Their safety features are far beyond our current reactors by orders of magnitude.

#### Pyro-processing is developed now and is comparatively better than existing reactors.

Tom Blees, 5-31-2011, 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, Idaho Samizdat: Nuke Notes, “Critique of MIT Nuclear Fuel Cycle Report,” <http://djysrv.blogspot.com/2011/05/critique-of-mit-nuclear-fuel-cycle.html>

The public views adequate nuclear waste management as a critical linchpin in further development of nuclear energy. The technical community, therefore, needs to provide a practical approach to deal with the waste issue. The Fukushima accidents call attention to the importance of managing spent fuel safely. It appears the best technical approach is extracting the actinides from spent fuel, which reduces the effective lifetime of nuclear wastes from ~300,000 years to ~300 years. Extracting actinides (and using them to generate power) is by far the best technical approach to dealing with nuclear wastes. The MIT Study fails to mention this important possibility. If actinide extraction is chosen as a pathway for waste “disposal,” the recovered actinides still must be transmuted to fissile material or fissioned directly. This can be done only in fast reactors. Actinides can be burned in fast reactors, generating energy and at the same time creating more fissile material for the future. A key advantage of fast reactors is that they can be utilized as “burners” when excess plutonium inventories exist, and then converted to “breeders” whenever needed. Only fast reactors can satisfy the waste-disposal mission simply and effectively while extending utilization of the uranium resources by more than two orders of magnitude. Thermal reactors—such as LWRs and high-temperature gas-cooled reactors—utilize less than 1% of uranium resources, even with recycling of plutonium and some of the uranium. Thermal-spectrum reactors, even optimized, can extend the resource utilization only marginally, and they cannot burn actinides effectively. Actinide recycling also requires an efficient processing technology, with improved economics and nonproliferation characteristics. The pyroprocessing technique based on electrorefining, developed in the IFR program, has the potential to recover the actinides from LWR spent fuel as well as to fully recycle fuel in fast reactors. The fundamentals of pyroprocessing have already been demonstrated – this is not new science. The technology is now ready for pilot-scale demonstration, and it should be given the highest priority. We do not need decades of R&D to pursue all esoteric ideas. We already have in our hands on the most advanced technology, technology that no other countries possess. The MIT Study also talks about the inter-generational equity considerations. We believe that our generation should demonstrate the technologies that will solve the energy supply and waste management problems, rather than proposing a century-long interim storage of the spent nuclear fuel.

### EXTRA

#### Pyro-processing solves, government investment is key.

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.

#### Investment in pyro-processing by the government is necessary to sustain the nuclear industry – prices and management.

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. 39, <http://humanities.uchicago.edu/orgs/institute/bigproblems/Team7-1210.pdf>

Increasing government support of advancements in reprocessing in the U.S. would encourage growth and investment in this technology. Therefore, continued government commitment to researching pyroprocessing and other advanced fuel cycle technologies is vital to the nuclear industry, especially if we envision this technology maturing internationally. As unsustainable as our current nuclear waste disposal strategies are, we believe in the current political climate, commercial reprocessing in the United States are not a viable option due to high environmental and technological costs, as well as having significant nuclear proliferation threats. However, in order for the U.S. to employ pyroprocessing in the future, the government must begin now to incentivize the technology for firms and investors. As uranium prices are expected to increase in the future, as well as an increasing concern regarding the management of nuclear waste worldwide, reprocessing may become a promising solution provided investments are made to address current challenges in the field.

#### No new U.S. booms in expansion for nuclear power – high costs and no storage.

Michael Bastasch, 3-8-2012, The Daily Caller, “Fukushima disaster halts progress of nuclear power in the US,” <http://dailycaller.com/2012/03/08/fukushima-disaster-halts-progress-of-nuclear-power-in-the-us/>

After the Fukushima disaster, all of these initiatives were halted in their tracks. Other obstacles to expanding nuclear power include concerns over the high costs of nuclear plants, the shale revolution that is exploiting America’s rich natural gas deposits and the inability of Congress to find an adequate place to store nuclear waste. The Energy Policy Act of 2005 “provides loan guarantees of up to 80% of a project’s cost and a production tax credit of 1.8 cents per kilowatt hour for new nuclear capacity beginning operation by 2020,” according to the Institute for Energy Research (IER). The act incentivized many new applications for plant approvals to be filed with the Nuclear Regulatory Commission, but high capital costs are still keeping these plants from being built, according to IER. As for nuclear waste disposal, the future seems uncertain. Currently, waste is stored on site at 104 nuclear plants in the U.S., but those facilities were supposed to be temporary. California, Illinois, Maine, Massachusetts, Virginia and West Virginia say they won’t lift their nuclear moratoriums until a permanent and safe solution is discovered, according to the National Conference of State Legislatures. Nevada’s Yucca Mountain was thought to be the solution to this problem, but in 2009 the Obama administration withdrew its support for Yucca Mountain due to fierce political opposition in Nevada. Nuclear power proponents hoped that the administration would again consider the site, but a recent report by the president’s Blue Ribbon Commission did not consider Yucca Mountain’s feasibility. There are even doubts surrounding the newly-approved Georgia reactors, as the plants may begin generating electricity eight months later than expected, according the Augusta Chronicle. Supporters of nuclear power, however, still retain some optimism because of the approval of the Georgia reactors and a dual reactor plant in South Carolina. A poll by the Nuclear Energy Institute says that 81 percent of Americans view nuclear energy as “important to meeting the nation’s future electricity needs,” and 64 percent of respondents favoring the use of nuclear power in the U.S.

# 2AC v. Michigan State GaTh

### 2AC prolif

#### Nuclear terrorism is extremely likely and is comparatively the largest threat to international stability.

Zafar Nawaz Jaspal, 2012, is Associate Professor at the Department of International Relations, Quaid-I-Azam University, Islamabad, Pakistan, is advisor on Non-Proliferation at the South Asian Strategic Stability Institute, London, Center of Excellence: Defense against Terrorism, Ankara, Turkey and Armed Forces War College, National Defense University, Islamabad, Command and Staff College Quetta, a Course Coordinator at the Foreign Services Academy, Ministry of Foreign Affairs, a Research Fellow at the Institute of Strategic Studies, Islamabad and Islamabad Policy Research Institute, Journal of Political Studies, Vol. 19 Issue 1, "Nuclear/Radiological Terrorism: Myth or Reality?,” Ebsco Host

The misperception, miscalculation and above all ignorance of the ruling elite about security puzzles are perilous for the national security of a state. Indeed, in an age of transnational terrorism and unprecedented dissemination of dual-use nuclear technology, ignoring nuclear terrorism threat is an imprudent policy choice. The incapability of terrorist organizations to engineer fissile material does not eliminate completely the possibility of nuclear terrorism. At the same time, the absence of an example or precedent of a nuclear/radiological terrorism does not qualify the assertion that the nuclear/radiological terrorism ought to be remained a myth. Farsighted rationality obligates that one should not miscalculate transnational terrorist groups — whose behavior suggests that they have a death wish — of acquiring nuclear, radiological, chemical and biological material producing capabilities. In addition, one could be sensible about the published information that huge amount of nuclear material is spread around the globe. According to estimate it is enough to build more than 120,000 Hiroshima-sized nuclear bombs (Fissile Material Working Group, 2010, April 1). The alarming fact is that a few storage sites of nuclear/radiological materials are inadequately secured and continue to be accumulated in unstable regions (Sambaiew, 2010, February). Attempts at stealing fissile material had already been discovered (Din & Zhiwei, 2003: 18).Numerous evidences confirm that terrorist groups had aspired to acquire fissile material for their terrorist acts. Late Osama bin Laden, the founder of AL Qaeda stated that acquiring nuclear weapons was a “religious duty” (Yusufzai, 1999, January 11). The IAEA also reported that “al-Qaeda was actively seeking an atomic bomb.” Jamal Ahmad al-Fadl, a dissenter of Al Qaeda, in his trial testimony had “revealed his extensive but unsuccessful efforts to acquire enriched uranium for al-Qaeda” (Allison, 2010, January: 11). On November 9, 2001, Osama bin Laden claimed that “we have chemical and nuclear weapons as a deterrent and if America used them against us we reserve the right to use them (Mir, 2001, November 10).” On May 28, 2010, Sultan Bashiruddin Mahmood, a Pakistani nuclear scientist confessed that he met Osama bin Laden. He claimed that “I met Osama bin Laden before 9/11not to give him nuclear know-how, but to seek funds for establishing a technical college in Kabul (Syed, 2010, May 29).” He was arrested in 2003 and after extensive interrogation by American and Pakistani intelligence agencies he was released (Syed, 2010, May 29). Agreed, Mr. Mahmood did not share nuclear know-how with Al Qaeda, but his meeting with Osama establishes the fact that the terrorist organization was in contact with nuclear scientists. Second, the terrorist group has sympathizers in the nuclear scientific bureaucracies. It also authenticates bin Laden’s Deputy Ayman Zawahiri’s claim which he made in December 2001: “If you have $30 million, go to the black market in the central Asia, contact any disgruntled Soviet scientist and a lot of dozens of smart briefcase bombs are available (Allison,2010, January: 2).”The covert meetings between nuclear scientists and al Qaeda members could not be interpreted as idle threats and thereby the threat of nuclear/radiological terrorism is real. The 33Defense Secretary Robert Gates admitted in 2008 that “what keeps every senior government leader awake at night is the thought of a terrorist ending up with a weapon of mass destruction, especially nuclear(Mueller, 2011, August 2).” Indeed, the nuclear deterrence strategy cannot deter the transnational terrorist syndicate from nuclear/radiological terrorist attacks.

### 2AC solvency

#### Loan guarantees is the best way to incentivize new nuclear energy – it is given at no cost.

NEI, 2012, Nuclear Energy Institute, “New Reactor Development,” <http://www.nei.org/112thcongress/new-reactor-development/>

The NRC certified Westinghouse Electric Co.'s revised AP1000 reactor design in December 2011. The AP1000 reactor will be used at the Vogtle facility and at South Carolina Electric & Gas Co.'s V.C. Summer site in Jenkinsville, which was licensed by the NRC in March 2012. The Nuclear Regulatory Commission is reviewing 11 license applications for 18 new nuclear reactors. The new NRC licensing process moves the licensing and safety issues to the front of three processes: approval of standardized reactor designs, early site permits, and combined construction and operating licenses. In addition, the licensing process provides greater opportunity for public input at the front end of the project. Costs Electricity generated from nuclear power can be competitive with other new sources of baseload power. This is true even before including the cost impact of potential restrictions on carbon dioxide and other greenhouse gas emissions. Loan Guarantees The Department of Energy loan guarantee program is the most effective program for addressing the major challenge facing new nuclear power plants: construction financing. Loan guarantees through DOE are available for 10 technologies—including nuclear power—that reduce, sequester or avoid greenhouse gas emissions. Recipients of loan guarantees for nuclear energy projects pay a fee and cover all administrative costs incurred by the government program. There is no cost to the taxpayer. In fact, a disciplined process will help lower electricity prices for consumers and will actually make money for the U.S. Treasury. Small Reactor Designs Small reactors will provide energy companies with an array of electricity production options. Their small size (typically fewer than 350 megawatts) and modular construction will allow these reactors to be built in a controlled factory setting, reducing the financing challenge and matching a variety of needs for low-carbon energy.

### 2AC capitalism/neoliberalism bad

#### Utilitarianism is the only framework of evaluation and alternatives are inevitability self-contradictory.

Joseph S. Nye, 1986, Phd Political Science Harvard. University; Served as Assistant Secretary of Defense for International Security Affairs; “Nuclear Ethics,” pg. 18-19

The significance and the limits of the two broad traditions can be captured by contemplating a hypothetical case.34 Imagine that you are visiting a Central American country and you happen upon a village square where an army captain is about to order his men to shoot two peasants lined up against a wall. When you ask the reason, you are told someone in this village shot at the captain's men last night. When you object to the killing of possibly innocent people, you are told that civil wars do not permit moral niceties. Just to prove the point that we all have dirty hands in such situations, the captain hands you a rifle and tells you that if you will shoot one peasant, he will free the other. Otherwise both die. He warns you not to try any tricks because his men have their guns trained on you. Will you shoot one person with the consequences of saving one, or will you allow both to die but preserve your moral integrity by refusing to play his dirty game? The point of the story is to show the value and limits of both traditions. Integrity is clearly an important value, and many of us would refuse to shoot. But at what point does the principle of not taking an innocent life collapse before the consequentialist burden? Would it matter if there were twenty or 1,000 peasants to be saved? What if killing or torturing one innocent person could save a city of 10 million persons from a terrorists' nuclear device? At some point does not integrity become the ultimate egoism of fastidious self-righteousness in which the purity of the self is more important than the lives of countless others? Is it not better to follow a consequentialist approach, admit remorse or regret over the immoral means, but justify the action by the consequences? Do absolutist approaches to integrity become self-contradictory in a world of nuclear weapons? "Do what is right though the world should perish" was a difficult principle even when Kant expounded it in the eighteenth century, and there is some evidence that he did not mean it to be taken literally even then. Now that it may be literally possible in the nuclear age, it seems more than ever to be self-contradictory.35 Absolutist ethics bear a heavier burden of proof in the nuclear age than ever before.

#### Predictions are inevitable and good.

George Friedman, May 2008, founder of Stratfor, “The Love of One’s Own and the Importance of Place,” Stratfor

Forecasting is built into the human condition. Each action a human being takes is intended to have a certain outcome. The right to assume that outcome derives from a certain knowledge of how things work. Sometimes, the action has unexpected and unintended consequences. The knowledge of how things work is imperfect. But there is a huge gulf between the uncertainty of a prediction and the impossibility of a prediction. When I get up and turn on the hot water, it is with the expectation that the hot water will be there. It isn’t always there and I may not have a full understanding of why it will be there, but in general, it is there and I can predict that. A life is made up of a fabric of such expectations and predictions. There is no action taken that is not done with the expectation, reasonable or not, erroneous or not, of some predictable consequence. The search for predictability suffuses all of the human condition. Students choose careers by trying to predict what would please them when they are 30 years older, what would be useful and therefore make them money and so on. Businesses forecast what can be sold and to whom. We forecast the weather, the winners of elections, the consequences of war and so on. There is no level on which human beings live that they don’t make forecasts and, therefore, on which they don’t act as if the world were to some degree predictable.

#### Extinction outweighs – as long as there is some life there’s only a risk they retain ontological capacity.

Hans Jonas, 1996, Former Alvin Johnson Prof. Phil. – New School for Social Research and Former Eric Voegelin Visiting Prof. – U. Munich, “Morality and Mortality: A Search for the Good After Auschwitz,” p. 111-2

With this look ahead at an ethics for the future, we are touching at the same time upon the question of the future of freedom. The unavoidable discussion of this question seems to give rise to misunderstandings. My dire prognosis that not only our material standard of living but also our democratic freedoms would fall victim to the growing pressure of a worldwide ecological crisis, until finally there would remain only some form of tyranny that would try to save the situation, has led to the accusation that I am defending dictatorship as a solution to our problems. I shall ignore here what is a confusion between warning and recommendation. But I have indeed said that such a tyranny would still be better than total ruin; thus, I have ethically accepted it as an alternative. I must now defend this standpoint, which I continue to support, before the court that I myself have created with the main argument of this essay. For are we not contradicting ourselves in prizing physical survival at the price of freedom? Did we not say that freedom was the condition of our capacity for responsibility—and that this capacity was a reason for the survival of humankind?; By tolerating tyranny as an alternative to physical annihilation are we not violating the principle we established: that the How of existence must not take precedence over its Why? Yet we can make a terrible concession to the primacy of physical survival in the conviction that the ontological capacity for freedom, inseparable as it is from man's being, cannot really be extinguished, only temporarily banished from the public realm. This conviction can be supported by experience we are all familiar with. We have seen that even in the most totalitarian societies the urge for freedom on the part of some individuals cannot be extinguished, and this renews our faith in human beings. Given this faith, we have reason to hope that, as long as there are human beings who survive, the image of God will continue to exist along with them and will wait in concealment for its new hour. With that hope—which in this particular case takes precedence over fear—it is permissible, for the sake of physical survival, to accept if need be a temporary absence of freedom in the external affairs of humanity. This is, I want to emphasize, a worst-case scenario, and it is the foremost task of responsibility at this particular moment in world history to prevent it from happening. This is in fact one of the noblest of duties (and at the same time one concerning self-preservation), on the part of the imperative of responsibility to avert future coercion that would lead to lack of freedom by acting freely in the present, thus preserving as much as possible the ability of future generations to assume responsibility. But more than that is involved. At stake is the preservation of Earth's entire miracle of creation, of which our human existence is a part and before which man reverently bows, even without philosophical "grounding." Here too faith may precede and reason follow; it is faith that longs for this preservation of the Earth (fides quaerens

#### How we know something doesn’t influence material reality.

Alexander Wendt, 2000, Professor of International Security and PolSci, Ohio State, On the Via Media, Review of International Studies 26

In the book I argue that, compared to ontology-talk, the value of epistemology talk for a discipline like IR is considerably less than something as imposing as the third ‘Great Debate’ might suggest. What matters more is what there is, not how we can know it, since we clearly do know things, and the ‘how’ of this knowledge will necessarily vary with the many different kinds of questions we ask in our field, and the varied tools at our disposal for answering them.

#### No collapse - capitalism is self-correcting in terms of energy – responsibility and regulations limits plundering.

Jeffrey Hollender & Bill Breen, 2010, Founder of the American Sustainable Business Council, a progressive alternative to the Chamber of Commerce, Editorial Director of the Fast Company, The Responsibility Revolution: How the Next Generation of Businesses will Win, p. xix

The responsibility revolution is about more than cutting carbon, reducing energy use, monitoring factories, or donating to charities. It’s about reimagining companies from within: innovating new ways of working, instilling a new logic of competing, identifying new possibilities for leading, and redefining the very purpose of business. Consequently, we’ve drawn on the best thinking not only from the corporate responsibility arena, but also from the realms of strategy, leadership, and management. Others, to whom we are indebted, have developed some of this book’s core principles. (We will acknowledge them as we present their ideas.) Our intent is to show how an emerging breed of business revolutionaries is turning theory into practice and building organizations that grow revenue by contributing to the greater good. This is a book about change, but it seeks to help companies change on the inside—change their priorities, the way they organize, how they compete, and the way they interact with the world. We fully concede that many companies, perhaps even most companies, won’t willingly alter their behavior. But they will change nonetheless, and it won’t be because they’ve suddenly seen the light. It will be because massive numbers of consumers, a spreading swarm of competitors, values-driven employees, and even that laggard indicator, the federal government, makes them change. Change is under way. The responsibility revolution spreads. Perhaps you’ve seen the insurrection begin to roil your industry, and you’re determined to get out in front of it. If so, welcome to the cause.

#### Prefer our evidence – they conflate bad human decision making with capitalism.

Jay Richards, 2009, PhD with honors in Philosophy and Theology from Princeton, Money, Greed, and God: Why Capitalism Is the Solution and Not the Problem, p. 164

Too many critics confuse the free market with the bad choices free people make. Rod Dreher, for instance, chastises fellow conservatives, saying, “We look down on the liberal libertine who asserts the moral primacy of sexual free choice, but some- how miss that the free market we so uncritically accepts exalts personal fulfillment through individual choice as the summit of human existence.”9 Perhaps they miss that fact because it’s not a fact. The free market doesn’t exalt anything. Human beings exalt and denounce things like sexual free choice. Human beings might exalt “individual choice as the summit of human exis- tence,” but a system of free exchange doesn’t do that. In a free economy, sinful entrepreneurs may entice customers with pornography, and sinful customers may buy it. But having free choices in the market doesn’t dictate what people will choose. That’s the whole point of freedom: it always involves costs—that is, trade-offs. To choose one path is to foreclose the opposite path. Even God accepted trade-offs. He chose to create a world with free beings, one that allowed those beings to turn against him. And they did. But their freedom didn’t cause them to choose the bad. It just allowed them to. So, too, with a free economy. Critics notice all the vice present in free societies. But it is only in free societies that we can fully exercise our virtue. Charity is charity, for instance, only if it’s not coerced. Besides, there’s no evidence that state control of the economy makes a citizenry more virtuous. Every social ill in modern- day America, from widespread abortion and alcoholism to family breakdown, was much worse in statist and communist countries.

#### The move to IFR is necessary to solve the root causes of exploitation - ends want and war – great divide is based on mis-understanding.

David Walters, 6-14-2011, worked as a union power plant operator for 24 years in California, currently a member of Socialist Organizer, US Section of the Fourth International, Permanent Revolution, “FUKUSHIMA, NUCLEAR ENERGY AND A SOCIALIST PROGRAM,” <http://climateandcapitalism.com/2011/06/14/socialist-arguments-for-nuclear-power/>

We have serious issues facing our class, our planet. From economic development of the productive forces in the oppressed neo-colonial world to raise their standard of living, to the phasing out of climate-changing fossil fuel use, we are going to require more, not, less energy, specifically electricity. Most on the left are at best confused by this and at worse, seek a return to some sort of pastoral green, “democratic” pre-industrial utopia. As Marxists we should reject this “we use too much” scenario that has infected the left across the world. We certainly should use energy more wisely, more efficiently and with a sense of conservation. This can happen only when the profit motive is removed and scarcity in basic necessities is a thing of the past. No one should object to this. But these things do not produce one watt of power, especially if you consider what we have to do. These include: Switching off from fossil fuels completely (they should be used only as chemical feedstock, i.e. as the basic material to make chemicals and lubricants) Increasing the development of the productive forces especially in the developing world. This means developing whole electrical grids, new, primarily non-fossil fuel, forms of generation and the infrastructure to support this, for the billions without any electrical usage at all Freeing up the productive forces to eliminate all forms of want as the material basis for a true socialist mode of production. Using nuclear energy is both the cheapest and safest way to do this. George Monbiot in his latest entry on his blog\* challenges the renewable energy advocates with some hard questions. No socialist by any means, Monbiot has brought attention to the issue of energy and what it will take to reduce carbon emissions. He notes, writing on Britain, among other things: “1. Reducing greenhouse gas emissions means increasing electricity production. It is hard to see a way around this. Because low-carbon electricity is the best means of replacing the fossil fuels used for heating and transport, electricity generation will rise, even if we manage to engineer a massive reduction in overall energy consumption. The Zero Carbon Britain report published by the Centre for Alternative Technology envisages a 55% cut in overall energy demand by 2030 – and a near-doubling of electricity production.” How is this electricity going to be produced in a sustained and regular way? We know wind generated power is erratic and variable, a problem only partially solvable by new continental wide electricity grids. We know other forms of low carbon power – tidal, coal with carbon capture and storage, large scale solar – are experimental and even if viable are likely to turn out more expensive than nuclear. We get no answer from so-called socialist Greens on this problem, at least not yet. They simply have not considered the real issues. Monbiot goes on: “3. The only viable low-carbon alternative we have at the moment is nuclear power. This has the advantage of being confined to compact industrial sites, rather than sprawling over the countryside, and of requiring fewer new grid connections (especially if new plants are built next to the old ones). It has the following disadvantages: “a. The current generation of power stations require uranium mining, which destroys habitats and pollutes land and water. Though its global impacts are much smaller than the global impacts of coal, the damage it causes cannot be overlooked. “b. The waste it produces must be stored for long enough to be rendered safe. It is not technically difficult to do this, with vitrification, encasement and deep burial, but governments keep delaying their decisions as a result of public opposition. “Both these issues (as well as concerns about proliferation and security) could be addressed through the replacement of conventional nuclear power with thorium or integral fast reactors but, partly as a result of public resistance to atomic energy, neither technology has yet been developed. (I’ll explore the potential of both approaches in a later column).” I want to address this last point. Monbiot is slowly seeing his way to something that has taken a long time: that nuclear energy is really the only way to go, even in light of the “big three” accidents: Three Mile Island, Chernobyl and Fukushima. These new technologies he mentions, the Liquid Fluoride Thorium Reactor (which doesn’t require any uranium mining, enrichment or long term disposal of spent fuel) and the Integral Fast Reactor, provide the material basis for eliminating all fossil fuels and for a future society without want, wars or exploitation that is a socialist one. Where Monbiot and I come together is not, obviously, the socialist requirement to get rid of capitalism. It is over the need for more energy, not less. It is over the realization that renewables cannot do it except in the most utopian of fantasies. The real “Great Divide” is between those among the Greens who run on fear and fantasy, and those socialists that have a materialist understanding of the need to move toward a society based not just on current human needs alone, but on expanding humanity’s ability to power such a society. Only nuclear can do this.

#### Their impact cards don’t assume the world of the aff – IFRs transform economic and geopolitical paradigms – eliminating gross inequality.

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. 335-6

When the material comforts of existence are seen as being limited, then consumption beyond one’s needs does indeed carry an undeniable ethical weight. As Ralph Waldo Emerson put it lo those many years ago, “Superfluity is theft.” Even when the energy and raw materials involved are plentiful, there remains the often conveniently ignored issue of the conditions under which goods have been produced, be they agricultural or manufactured commodities. It is disingenuous in the extreme to point to the abolition of slavery as evidence of the social evolution of mankind when millions of desperately poor people labor under conditions that can still honestly be considered as slavery. The fact that we don’t335have slaves in our home is hardly confirmation of our benevolence. The moral questions of economic fairness will not be settled by availing ourselves of the technologies promoted in this book, but should command our attention and concern indefinitely. My point is not to justify exploitation of either human or material resources, but to point out that a transformation of energy and raw material technologies as proposed herein will present a radically transformed palette upon which to paint the picture of humanity’s future. Our new course will remove the limitations by which finite natural resources and energy supplies have circumscribed our existence. Unlimited energy coupled with virtually complete recycling of materials and the production of consumer goods from plentiful or renewable resources will finally allow humanity to be unshackled from the zero-sum mentality. Raising the living standards of our billions of disadvantaged brethren will be seen as a positive development by even the most voracious consumer societies, rather than perceived with foreboding as somehow detrimental to their way of life. Admittedly this will take some getting used to. The revolution will be not just technological and political, but psychological. The passion with which consumerism is pursued is frequently grotesque in its extremes, yet the revulsion it engenders may not be so strong when it can be viewed more as shallow foolishness than callous selfishness. Much of what is considered virtuous today will be seen more as simply a matter of personal preference in a world where creature comforts are no longer in limited supply. The concept of self-denial will have to be looked at anew. Rather than concentrating on husbanding limited resources, our attention can be turned to welcoming the rest of our fellow humans into a new reality where creature comforts are the universal norm. Abundant energy and wise336use of basic resources are the keys. Clearly the technologies are already within our grasp. This won’t happen overnight, but it would be foolish to dally. The conversion of primary power systems to fast reactors will necessarily be a gradual process, which in the best-case scenario will take a few decades. Conversion of the vehicle industry to boron, however, is another story. It is entirely conceivable that boron fueled vehicles could be driving on our highways within five years. Ironically the first boron recycling plants that would be a corollary of the conversion may end up operating with natural gas for their heat requirements, since the IFR program simply won’t be able to be implemented as quickly as the boron system, and it’s questionable whether existing electrical generation systems would be able to handle the increased demand of electrically powered boron recycling plants. This would, however, be only an interim fix, and would allow the vehicle fleets to get off to a quick start. If the plasma conversion method proves feasible, though, then garbage alone will provide all the energy we need for boron recycling. Long before the conversion to boron is complete, the demand for oil will have dropped to the point where the USA, one of the world’s thirstiest countries when it comes to oil, will be able to rely solely on North American supplies, resulting in geopolitical and economic realignments that will be a harbinger of things to come. Even though oil prices will surely plummet worldwide, and while the temporary price of boron recycling may well be higher than it will be once IFRs are able to provide all the power necessary to support the system, the price disparity will easily be great enough and the environmental benefits so overwhelming that boron vehicles will surely carry the day even in the near term.

#### IFRs do not uniquely prop-up capitalism/neoliberalism – administration will cause a de-facto type socialist system.

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. 280

Let’s examine the features of this proposed nonprofit global energy consortium and how it will work. We’ll call it, henceforth, the Global Rescue Energy Alliance Trust (GREAT). The international negotiations and hard choices required to create such a system will be formidable, requiring policies that will cut harshly against the corporate and political grain—more in some countries than others. But nobody ever said that implementing a plan to save the planet was going to be a bed of roses. In reality, though, we’ll see that aside from the impossibility of placating the greediest power mongers (in both senses of the phrase), the advantages of such a system would be overwhelmingly positive for the rest of us. Corporatist true believers (free market ideologues) will undoubtedly argue that GREAT is a matter of ideology, and its supporters will surely be tarred as socialists or even communists in279the inevitable efforts to discredit this proposal. But GREAT is not a matter of ideology, it’s a matter of sanity. Just as the world lived under the threat of nuclear annihilation during the long tense years of the cold war, so we will continue to live under the threat of nuclear terrorism until we recognize the fact—not the opinion—that the only way we can ever hope to remove the threat of nuclear proliferation and nuclear terrorism is to put the entire nuclear fuel cycle under strict international control. This perforce requires us to end the era of private utility companies’ involvement in nuclear power. As new clear power assumes its role as the dominant energy source of the future, the only recourse for private utilities will be in renewable technologies that contribute to the overall energy supply system. Given that IFRs and the existing thermal reactors will likely supply the vast majority of power at least in the near term, it stands to reason that the overall energy infrastructure and administration will fall under the purview of GREAT, making electrical generation and distribution a de facto near-socialized system. (Since usage will still determine users’ costs, it would not be a socialized system perse, but more akin to a cooperative. But what’s in a word?) If wind and solar power are practical alternatives to nuclear, as their proponents maintain, then there will be plenty of room for investment by private sector energy companies, though given the history of manipulation of energy markets it would be prudent to limit the generating capacity of any one company along the lines ofPUHCA.214214 The Public Utilities Holding Company Act, a U.S. law mandating the regulation of electrical utilities. It was repealed in 2006, opening the floodgates for abuse that could make California’s energy “crisis” look like a walk in the park. Americans, you are dulyforewarned.280Subsidization of any energy source will be unnecessary once the IFRs are up and running. The customers will provide a steady income stream. If it does, indeed, prove to be the case that solar and/or wind power are truly competitive with new clear on a level playing field, then we’ll see an upsurge of renewable energy production in the hands of private companies and individuals. As long as the system has regulatory limits, capitalism in the power arena will thrive.

#### This means the plan is a pre-requisite - criticizing the current economic system is insufficient without a specific and workable alternative – a moral stand is not enough to start a revolution.

Lawrence Grossburg, 1992, Professor of COMS at UNC, Communication Studies Professor at UNC, We Gotta Get Out of This Place, p. 388-89

If it is capitalism that is at stake, our moral opposition to it has to be tempered by the realities of the world and the possibilities of political change. Taking a simple negative relation to it, as if the moral condemnaotion of the evil of capitalism is sufficient (granting that it does establish grotesque systems of inequality and oppression) is not likely to establish a viable political agenda. First, it is not at all clear what it would mean to overthrow capitalism in the current situation. Unfortunately, despite our desires, the “masses” are not waiting to be led into revolution, and it is not simply a case of their failure to recognize their own best interests, as if we did. Are we to decide—rather undemocratically, I might add—to overthrow capitalism in spite of their legitimate desires? Second, as much as capitalism is the cause of many of the major threats facing the world, at the moment it may also be one of the few forces of stability, unity and even, within limits, a certain “civility” in the world. The working system is, unfortunately, simply too precarious and the alternative options not all that promising. Finally, the appeal of an as yet unarticulated and even unimagined future, while perhaps powerful as a moral imperative, is simply too weak in the current context to effectively organize people, and too vague to provide any direction. Instead, the Left must think of ways to rearticulate capitalism without either giving up the critique or naively assuming that it can create capitalism with a human heart.”

### 2AC Quadrennial Technology Review CP

####  ‘Should’ does not mean mandatory.

Atlas, 1999, Collaboration, “Use of shall, should, may can,” rd13doc.cern.ch/Atlas/DaqSoft/sde/inspect/shall.html

shall' describes something that is mandatory. If a requirement uses 'shall', then that requirement \_will\_ be satisfied without fail. Noncompliance is not allowed. Failure to comply with one single 'shall' is sufficient reason to reject the entire product. Indeed, it must be rejected under these circumstances. Examples: "Requirements shall make use of the word 'shall' only where compliance is mandatory." This is a good example. "C++ code shall have comments every 5th line." This is a bad example. Using 'shall' here is too strong. should 'should' is weaker. It describes something that might not be satisfied in the final product, but that is desirable enough that any noncompliance shall be explicitly justified. Any use of 'should' should be examined carefully, as it probably means that something is not being stated clearly. If a 'should' can be replaced by a 'shall', or can be discarded entirely, so much the better.

#### QTR fails to translate into policy – a comprehensive energy policy like IFRs is managed across the whole government.

David Rothkopf, 10-26-2011, is President and CEO of Garten Rothkopf, an international advisory firm specializing in transformational global trends, notably those associated with energy, scholar at the Carnegie Endowment for International Peace, chairs the Carnegie Economic Strategy Roundtable, chairman of the National Strategic Investment Forum Dialogue, advisory board of the U.S. Institute of Peace, the John Hopkins/Bloomberg School of Public Health, the Center for Global Development, and the Center for the Study of the Presidency, Foreign Policy, “The time for a White House-led national energy policy is right now,” <http://rothkopf.foreignpolicy.com/Obama>

One area in which such an effort is not just needed but is effectively several generations overdue is energy policy. To date, the administration's efforts in the area of energy have concentrated on greening the U.S. energy mix and the jobs that green energy might bring. While worthy, the efforts have been bogged down and undercut for a variety of reasons: ranging from the tactical decision to put health care ahead of energy among policy priorities, the inflated and dubious nature of many green job provisions, the success of climate skeptics in impeding the cap-and-trade debate, and the recent kerfuffle over Solyndra (and, by extension, government energy loan programs, alternative energy programs in general, and the whole idea of "picking winners" associated with some elements of green energy policy).The Energy Department even initiated a worthy Quadrennial Technology Review that mimicked the Quadrennial Defense Review, Quadrennial Homeland Security Review, and the Quadrennial Diplomacy and Development Review processes at Defense, Homeland Security, and State respectively. But it was not a broad-gauge energy policy and the United States has been in need of such a policy for decades. There have been abortive efforts in that direction but they have been compromised or stopped short of becoming a regular element of U.S. government policy making. One reason for the problem is that despite the fact that the Department of Energy was created to help ensure the creation of such policies during the 1970s, it is simply incapable of overseeing the development of the kind of comprehensive policy that is needed. Unlike defense policy or diplomacy policy, critical components of a true energy policy are managed not in one agency but across the entirety of the U.S. government. It is a domestic and an international issue, a security and an economic issue, a regulatory, financial, diplomatic, and environmental issue.

### 2AC elections DA – Obama good

#### Swing state tracking, new polls, and electoral college – dems show artificial win from over-sampling.

Dean Chambers, 9-19-2012, journalist and commentator, elections analyst, Examiner, “Mitt Romney likely win in presidential election shown by three key polls,” <http://www.examiner.com/article/mitt-romney-likely-win-presidential-election-shown-by-three-key-polls>

Rasmussen Reports has released today, three key polls that show Mitt Romney's likely win in this year's presidential election over President Obama. The Rasmussen Reports Presidential Daily Tracking Poll released today shows Romney leading 47 percent to 46 percent over Obama. Rasmussen's Daily Swing State Tracking Poll of 11 key swing states won by President Obama in 2008 shows Romney leading them by the exact same percentages. The latest Rasmussen poll of New Hampshire released today shows Romney leading there 48 percent to 45 percent. New Hampshire is a key swing state that could make a difference with its four electoral votes, and George W. Bush would have reached 270 electoral voters in 2000 without having won this state. New Hampshire had narrowly favored Obama in many polls over the last few months and while the analysis conduced here by this columnist has consistently predicted Mitt Romney will win the state (based in part on knowledge of local politics in the state having lived in New England for years), most projected have shaded New Hampshire blue and predicted it will go for Obama. This Rasmussen survey is key in that it likely shows movement in New Hampshire in the direction of Mitt Romney.In the instance of an incumbent president who enjoys just about 100 percent name recognition and is seeking reelection, most of the undecided voters are likely to swing to the challenger by election day. This is especially true when the challenger remains still less known to the public than the incumbent, as is true with former Massachusetts Governor Mitt Romney. By election day, those other nine percent not favoring Romney or Obama in the Rasmussen Daily Tracking poll are likely include less than one percent voting for third party candidates and five or six percent of those nine will likely vote for Mitt Romney. That would indicate a popular vote win by Romney of about 53 percent to 46 percent, or the reverse of Obama's win in 2008. This would lead to an electoral college total of more than 300 electoral votes for Romney.The 11 swing states tracked by Rasmussen in it's swing state tracking poll show Romney leading 47 percent to 46 percent, where some weeks ago the two candidates were tied at 45 percent in the Rasmussen tracking poll of these 11 key swing states. President Obama won these same states collectively by a 53 percent to 46 percent margin in 2008. Now he is seven percent behind that finish now in these states. Romney is likely to capture most of the undecided votes and could win these states collectively by at least a 52 percent to 47 percent margin. That would likely lead to Romney winning Colorado, Florida, Iowa, Nevada, New Hampshire, North Carolina, Ohio, Virginia and Wisconsin while having a competitive chance in Michigan and Pennsylvania.If President Obama can only win Michigan and Pennsylvania among those 11 swing states, he can not be reelected to the presidency. As these polls stand today, the election of Mitt Romney as our next president looks likely.This picture differs with the perception being created by the results of some media-released national polls of the race that are skewed in favor of Obama because the survey results are realized by over-sampling Democrats. Two Democratic pollsters explained this and exposed how these polls are skewed.

#### GOP Fundraising to turn the tide

Jay Cost. 10/5/12. Morning Jay: Will October Be a Bad Month For Obama? http://www.weeklystandard.com/blogs/morning-jay-will-october-be-bad-month-obama\_653661.html?page=2

Third, the GOP fundraising machine is set to be deployed this month. As of August 31, the Romney-Ryan campaign, the Republican National Committee, and the Restore Our Future PAC had a cash-on-hand advantage of some $61 million over Obama-Biden, the Democratic National Committee, and the Priorities USA super PAC. Moreover, this broader GOP organization has outraised its Democratic counterpart in June, July, and August. And yet the GOP allowed the Democrats to outspend it on television during this period. But that will not be the case in October. At the very least, Republican advertisements will match Democratic ones – and it is quite possible that the GOP will outmatch the Democrats on the airwaves. So, contrary to the conventional wisdom, Obama enters the month of October with substantial problems. And with just a 3-point lead in the polls, he really cannot afford a bad month.

#### Fast reactors developed and popular with the public – waste management.

Tom Blees, 5-31-2011, 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, Idaho Samizdat: Nuke Notes, “Critique of MIT Nuclear Fuel Cycle Report,” <http://djysrv.blogspot.com/2011/05/critique-of-mit-nuclear-fuel-cycle.html>

The public views adequate nuclear waste management as a critical linchpin in further development of nuclear energy. The technical community, therefore, needs to provide a practical approach to deal with the waste issue. The Fukushima accidents call attention to the importance of managing spent fuel safely. It appears the best technical approach is extracting the actinides from spent fuel, which reduces the effective lifetime of nuclear wastes from ~300,000 years to ~300 years. Extracting actinides (and using them to generate power) is by far the best technical approach to dealing with nuclear wastes. The MIT Study fails to mention this important possibility. If actinide extraction is chosen as a pathway for waste “disposal,” the recovered actinides still must be transmuted to fissile material or fissioned directly. This can be done only in fast reactors. Actinides can be burned in fast reactors, generating energy and at the same time creating more fissile material for the future. A key advantage of fast reactors is that they can be utilized as “burners” when excess plutonium inventories exist, and then converted to “breeders” whenever needed. Only fast reactors can satisfy the waste-disposal mission simply and effectively while extending utilization of the uranium resources by more than two orders of magnitude. Thermal reactors—such as LWRs and high-temperature gas-cooled reactors—utilize less than 1% of uranium resources, even with recycling of plutonium and some of the uranium. Thermal-spectrum reactors, even optimized, can extend the resource utilization only marginally, and they cannot burn actinides effectively. Actinide recycling also requires an efficient processing technology, with improved economics and nonproliferation characteristics. The pyroprocessing technique based on electrorefining, developed in the IFR program, has the potential to recover the actinides from LWR spent fuel as well as to fully recycle fuel in fast reactors. The fundamentals of pyroprocessing have already been demonstrated – this is not new science. The technology is now ready for pilot-scale demonstration, and it should be given the highest priority. We do not need decades of R&D to pursue all esoteric ideas. We already have in our hands on the most advanced technology, technology that no other countries possess. The MIT Study also talks about the inter-generational equity considerations. We believe that our generation should demonstrate the technologies that will solve the energy supply and waste management problems, rather than proposing a century-long interim storage of the spent nuclear fuel.

# 2AR

#### Predictions impossible, dirty tactics inevitable.

Peggy Noonan. 10-4-12. Noonan: Romney Deflates the President. http://online.wsj.com/article/SB10000872396390444223104578036902059331748.html

As things tighten up, they will probably get dirty. It is a matter of conviction in both parties that the other side is more ruthless and brutal in its use of underhanded tactics. Both campaigns have probably been sitting on potentially damaging opposition research. Why? Because they don't want to win that way. Political operatives say they hate oppo because they hate to lower the tone of the national discourse. The truth is, oppo is bad for business. The press goes into full Lascivious Puritan mode, spreads the dirt and then tries to nail the provider. When everyone knows a strategist won dirty, he becomes controversial, future clients shy away, and the mortgage on the house in Umbria goes unpaid. But losing is even worse for business. Chicago won't go quietly. Be ready for trouble and able of rapid response.

#### Advocates of nuclear energy swamp unpopularity – strong media campaign.

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. 7-8, <http://www.carnegieendowment.org/files/Nuclear_Energy_7_0.pdf>

Advocates of nuclear energy have embarked on strong marketing campaigns. For example, the Nuclear Energy Institute (NEI) has run advertisements describing nuclear energy as “clean air” energy. The Clean and Safe Energy Todd Whitman and former Greenpeace activist Patrick Moore, has been funded by the nuclear industry. One industry slogan is “Know new nukes.” The slogan appears over a field of yellow soybean flowers. “Clean” energy appears to be a euphemism for renewables plus nuclear power, which is why anti-nuclear advocates were heart-ened by President Obama’s February address to Congress in which he spoke only of renewable energy, rather than clean energy (Wasserman, 2009). Opponents of nuclear energy generally have less money to spend on media campaigns, and their message is less pithy. They stress that nuclear power is not the solution to climate change and that it is dangerous, polluting, unsafe, and expensive. Only a few planned nuclear plants are in states that do not already have power plants, such as Utah, Missouri and Idaho. Most of the expected plants will be constructed on existing reactor sites, which make them more acceptable to the local public.

#### Recent polls say benefits trump Fukushima with voters.

Tim Gitzel, September 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), “US Nuclear Power Policy,” <http://www.world-nuclear.org/info/inf41_US_nuclear_power_policy.html>

Public opinion regarding nuclear power has generally been fairly positive, and has grown more so as people have had to think about security of energy supplies. Different polls show continuing increase in public opinion favorable to nuclear power in the USA. More than three times as many strongly support nuclear energy than strongly oppose it. Two-thirds of self-described environmentalists favor it. A May 2008 survey (N=2925) by Zogby International showed 67% of Americans favored building new nuclear power plants, with 46% registering strong support; 23% were opposed10. Asked which kind of power plant they would prefer if it were sited in their community, 43% said nuclear, 26% gas, 8% coal. Men (60%) were more than twice as likely as women (28%) to be supportive of a nuclear power plant. A March 2010 Bisconti-GfK Roper survey showed that strong public support for nuclear energy was being sustained, with 74% in favor of it 11. In particular, 87% think nuclear will be important in meeting electricity needs in the years ahead, 87% support license renewal for nuclear plants, 84% believe utilities should prepare to build more nuclear plants, 72% supported an active federal role in encouraging investment in "energy technology that reduces greenhouse gases", 82% agree that US nuclear plants are safe and secure, 77% would support adding a new reactor at the nearest nuclear plant, and 70% say that USA should definitely build more plants in the future. Only 10% of people said they strongly opposed the use of nuclear energy. In relation to recycling used nuclear fuel, 79% supported this (contra past US policy), and the figure rose to 85% if "a panel of independent experts" recommended it. Although 59% were confident that used reactor fuel could be stored safely at nuclear power plant sites, 81% expressed a strong desire for the federal government to move used nuclear fuel to centralized, secure storage facilities away from the plant sites until a permanent disposal facility is ready. Half of those surveyed considered themselves to be environmentalists. A February 2011 Bisconti-GfK Roper survey showed similar figures, and that 89% of Americans agree that all low-carbon energy sources – including nuclear, hydro and renewable energy – should be taken advantage of to generate electricity while limiting greenhouse gas emissions. Just 10% disagreed. Also some 84% of respondents said that they associate nuclear energy "a lot" or "a little" with reliable electricity; 79% associate nuclear energy with affordable electricity; 79% associate nuclear energy with economic growth and job creation; and 77% associate nuclear energy and clean air. A more general March 2010 Gallup poll (N=1014) on energy showed 62% in favor of using nuclear power, including 28% strongly so, and 33% against, the most favorable figures since Gallup began polling the question in 1994. However, only 51% of Democrat voters were in favour12. An early March 2011 Gallup poll just before the Fukushima accident showed 57% in favor and 38% against, and in March 2012 (N=1024) still 57% in favor with 40% against (men: 72%-27%, women 42%-51%). Regarding plant safety, the polls showed consistent 56-58% positive views over 2009-12, but men-women split similar. A survey conducted in September 2011 by Bisconti Research Inc. with GfK Roper showed that although support for nuclear power decreased following the Fukushima accident and compared with a year earlier (a survey carried out in March 2010 by Bisconti Research found 74% of Americans favored nuclear power), 62% of the 1000 adults surveyed in the latest poll were supportive of utilizing nuclear power while 35% expressed opposition. The survey found that 82% of Americans believed that lessons had been learned from Fukushima and 67% of respondents considered US nuclear power plants safe (the same level as reported one month before the nuclear accident in Japan occurred). Also 85% of said that an extension of commercial operation should be granted to those plants that comply with federal safety standards, and 59% believed more nuclear power plants should definitely be built in the future, while 75% contend that “Electric utilities should prepare now so that new nuclear power plants could be built if needed in the next decade.” Finally, further expansion of the site of the nearest already operating nuclear power plant is supported by 67% and opposed by 28%. By February 2012 support had increased slightly to 64% supported using nuclear power, while 33% opposed it. Some 81% of respondents believed that nuclear energy will be important in meeting the USA's future electricity needs (compared with 80% in September), and 82% thought the USA should "take advantage of all low-carbon energy sources, including nuclear, hydro and renewable energy." Significantly, 74% believed that nuclear power plants operating in the USA are safe, up from 67% in both 2011 surveys. However, a Harris survey in February 2012 (N=2056) showed that only 40% of US adults believed that the benefits of nuclear outweigh its risks, while 41% thought the reverse. A similar poll conducted in 2011 before the Fukushima accident occurred, indicated that 42% thought that the benefits outweighed the risks, while 37% believed the opposite. In a 2009 poll, 44% thought the benefits outweighed the benefits, while 34% thought they did not. The southern states had the highest percentage of people believing the benefits outweigh the risks (at 43%), compared with 33% in the East and 41% in the Midwest and West. Some 42% of Americans thought that the benefits of using coal outweighed the risks (up from 38% positive in 2011), while 40% said the risks outweighed the benefits.