# Mo State v Emory – round 2 AFF

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### 1AC prolif advantage

#### ADVANTAGE:\_\_ proliferation

#### Rapid cascade proliferation at the tipping point.

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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.

#### Proliferation causes nuclear war and extinction – deterrence fails for three reasons.

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The spread of nuclear weapons poses a number of severe threats to international peace and U.S. national security including: nuclear war, nuclear terrorism, emboldened nuclear powers, constrained freedom of action, weakened alliances, and further nuclear proliferation. This section explores each of these threats in turn. Nuclear War. The greatest threat posed by the spread of nuclear weapons is nuclear war. The more states in possession of nuclear weapons, the greater the probability that somewhere, someday, there is a catastrophic nuclear war. A nuclear exchange between the two superpowers during the Cold War could have arguably resulted in human extinction and a nuclear exchange between states with smaller nuclear arsenals, such as India and Pakistan, could still result in millions of deaths and casualties, billions of dollars of economic devastation, environmental degradation, and a parade of other horrors. To date, nuclear weapons have only been used in warfare once. In 1945, the United States used one nuclear weapon each on Hiroshima and Nagasaki, bringing World War II to a close. Many analysts point to sixty-five-plus-year tradition of nuclear non-use as evidence that nuclear weapons are unusable, but it would be naïve to think that nuclear weapons will never be used again. After all, analysts in the 1990s argued that worldwide economic downturns like the great depression were a thing of the past, only to be surprised by the dot-com bubble bursting in the later 1990s and the Great Recession of the late Naughts. [53] This author, for one, would be surprised if nuclear weapons are not used in my lifetime. Before reaching a state of MAD, new nuclear states go through a transition period in which they lack a secure-second strike capability. In this context, one or both states might believe that it has an incentive to use nuclear weapons first. For example, if Iran acquires nuclear weapons neither Iran, nor its nuclear-armed rival, Israel, will have a secure, second-strike capability. Even though it is believed to have a large arsenal, given its small size and lack of strategic depth, Israel might not be confident that it could absorb a nuclear strike and respond with a devastating counterstrike. Similarly, Iran might eventually be able to build a large and survivable nuclear arsenal, but, when it first crosses the nuclear threshold, Tehran will have a small and vulnerable nuclear force. In these pre-MAD situations, there are at least three ways that nuclear war could occur. First, the state with the nuclear advantage might believe it has a splendid first strike capability. In a crisis, Israel might, therefore, decide to launch a preemptive nuclear strike to disarm Iran’s nuclear capabilities and eliminate the threat of nuclear war against Israel. Indeed, this incentive might be further increased by Israel’s aggressive strategic culture that emphasizes preemptive action. Second, the state with a small and vulnerable nuclear arsenal, in this case Iran, might feel use ‘em or loose ‘em pressures. That is, if Tehran believes that Israel might launch a preemptive strike, Iran might decide to strike first rather than risk having its entire nuclear arsenal destroyed. Third, as Thomas Schelling has argued, nuclear war could result due to the reciprocal fear of surprise attack.[54] If there are advantages to striking first, one state might start a nuclear war in the belief that war is inevitable and that it would be better to go first than to go second. In a future Israeli-Iranian crisis, for example, Israel and Iran might both prefer to avoid a nuclear war, but decide to strike first rather than suffer a devastating first attack from an opponent. Even in a world of MAD, there is a risk of nuclear war. Rational deterrence theory assumes nuclear-armed states are governed by rational leaders that would not intentionally launch a suicidal nuclear war. This assumption appears to have applied to past and current nuclear powers, but there is no guarantee that it will continue to hold in the future. For example, Iran’s theocratic government, despite its inflammatory rhetoric, has followed a fairly pragmatic foreign policy since 1979, but it contains leaders who genuinely hold millenarian religious worldviews who could one day ascend to power and have their finger on the nuclear trigger. We cannot rule out the possibility that, as nuclear weapons continue to spread, one leader will choose to launch a nuclear war, knowing full well that it could result in self-destruction. One does not need to resort to irrationality, however, to imagine a nuclear war under MAD. Nuclear weapons may deter leaders from intentionally launching full-scale wars, but they do not mean the end of international politics. As was discussed above, nuclear-armed states still have conflicts of interest and leaders still seek to coerce nuclear-armed adversaries. This leads to the credibility problem that is at the heart of modern deterrence theory: how can you threaten to launch a suicidal nuclear war? Deterrence theorists have devised at least two answers to this question. First, as stated above, leaders can choose to launch a limited nuclear war.[55] This strategy might be especially attractive to states in a position of conventional military inferiority that might have an incentive to escalate a crisis quickly. During the Cold War, the United States was willing to use nuclear weapons first to stop a Soviet invasion of Western Europe given NATO’s conventional inferiority in continental Europe. As Russia’s conventional military power has deteriorated since the end of the Cold War, Moscow has come to rely more heavily on nuclear use in its strategic doctrine. Indeed, Russian strategy calls for the use of nuclear weapons early in a conflict (something that most Western strategists would consider to be escalatory) as a way to de-escalate a crisis. Similarly, Pakistan’s military plans for nuclear use in the event of an invasion from conventionally stronger India. And finally, Chinese generals openly talk about the possibility of nuclear use against a U.S. superpower in a possible East Asia contingency. Second, as was also discussed above leaders can make a “threat that leaves something to chance.”[56] They can initiate a nuclear crisis. By playing these risky games of nuclear brinkmanship, states can increases the risk of nuclear war in an attempt to force a less resolved adversary to back down. Historical crises have not resulted in nuclear war, but many of them, including the 1962 Cuban Missile Crisis, have come close. And scholars have documented historical incidents when accidents could have led to war.[57] When we think about future nuclear crisis dyads, such as India and Pakistan and Iran and Israel, there are fewer sources of stability that existed during the Cold War, meaning that there is a very real risk that a future Middle East crisis could result in a devastating nuclear exchange.

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

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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.

#### Dealing with waste is inevitable in the squo – using PRISM is the only method of securing fissile material from theft and stopping proliferation.

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

#### Transitioning to PRISMs stops PUREX/UREX development and solves verification difficulties.

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

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

#### Bargaining breaks down with uncertainty and overconfidence from proliferation.

Erik Gartzke, 5-1-2010, Ph.D. in Political Science from the University of Iowa, associate professor of political science at UC San Diego, “Nuclear Proliferation Dynamics and Conventional Conflict,” http://dss.ucsd.edu/~egartzke/papers/nuketime\_05032010.pdf

A third possibility is that uncertainty about nuclear weapons status increases the hazard of militarized disputes. In contrast to the classical approach that emphasizes power relations, contemporary research on the causes of conflict focuses on the role of asymmetric information (Fearon 1995, Wagner 2000). Nations are more likely to fight if they underestimate one another’s respective resolve or capabilities. Bargaining breaks down when competitors cannot identify acceptable offers. Bargaining failures in turn heighten the probability of disputes. If nations are more likely to fight when they are uncertain about an enemy's capabilities, then capability shocks that make nations uncertain about the balance of power will lead to an increase in conflict. Countries with new military advantages may not yet be perceived as possessing significant advantages. Alternately, the proliferating country may itself overestimate the scale of its advantage. Nuclear proliferation is particularly prone to producing this type of uncertainty, given the extreme nature of nuclear capabilities shocks, the secrecy that enshrouds nuclear programs, and the fact that nuclear capabilities are not actually exercised (as opposed to the influence nuclear nations wield). Just as uncertainty peaks with the advent of possible new nuclear status, it decays quickly with the revelation of nuclear capabilities. Certainty about nuclear weapons capability may make countries no more dispute prone than certainty about the lack of nuclear status. War and peace are conditioned on nuclear secrecy or on nuclear uncertainty, not on the proliferation of nuclear weapons per se.8 The effects of uncertainty about nuclear status on whether nations initiate, or are the targets of, conflict are a bit more complicated to unravel. It is possible that uncertainty about nuclear status could lead to bargaining failure, and thus to a greater risk of a contest for either a potential initiator or a target. In the standard bargaining story, a state possesses an advantage about which its counterpart is dubious, either because other states also claim such an advantage, or because it is difficult to ascertain the consequences of the advantage for warfare, should conflict occur. Opponents can also be uncertain about the resolve or preferences of a nation, underestimating not capabilities but the willingness to use them if necessary. In the context of nuclear proliferation, one can imagine that other nations doubt claims of nuclear capabilities, or that they are uncertain about the willingness of a nation to pursue nuclear brinkmanship under certain circumstances, or that the opponent of the new nuclear power discounts delivery systems, command and control, or some other aspect affecting the veracity of threats. A nascent nuclear nation may feel compelled to press advantages that are not yet accepted by other powers. In doing so, the nuclear state risks a greater likelihood of a military contest. While either a potential attacker or a target can be uncertain about capabilities or resolve, it is much more in the nature of a challenger to be dissatisfied with the status quo. Proliferators are preference outliers. The same incentives that lead nations to seek out nuclear capabilities also encourage attempts to use newly acquired leverage to seek to effect change. Once demands are made, underestimation can lead to bargaining failures and warfare.

#### Controlling the fuel-cycle strengthens tacit bargaining to prohibit war – creates a framework of incentives.

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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.

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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.

#### GNEP/IFNEC is faltering - without U.S. leadership in advanced reprocessing technologies - proliferation from the collapsing IFNEC framework will be rampant.

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

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

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

Tom Blees, 6-4-2011, 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, BraveNewClimate,”Disposal of UK plutonium stocks with a climate change focus,” <http://bravenewclimate.com/2011/06/04/uk-pu-cc/>

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

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

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

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

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

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

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

#### By itself terrorism causes extinction.

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

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

### 1AC climate advantage

#### ADVANTAGE:\_\_ climate change

#### 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?

#### PRISM is needed to now to deal with climate issues – renewables and other fuels fail.

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

There is a pressing need to: (a) displace our heavy dependence on fossil fuels with sustainable, low-carbon alternative energy sources over the coming decades to mitigate the environmental damage of energy production and underpin global energy security [17], and (b) demonstrate a credible and acceptable way to safely deal with used nuclear fuel in order to clear a socially acceptable pathway for nuclear fission to be a major low-carbon energy source for this century. Given the enormous technical, logistical and economic challenges of adding carbon capture and storage to coal and gas power plants, we are faced with the necessity of a nearly complete transformation of the world’s energy systems. Objective analyses of the inherent constraints on wind, solar, and other less-mature renewable energy technologies inevitably show that they will fall short of meeting future low-emissions demands. A ‘go slow, do little’ approach to energy policy is not defensible given the urgency of the problems society must address, and the time required for an orderly transition of energy systems at a global scale. As such, SCGI advocates a near-term deployment of the Integral Fast Reactor. What is needed now is a two-pronged approach, for completion by 2020 or earlier, that involves: (i) demonstration of the pyroprocessing of LWR spent oxide fuel, and (ii) construction of a PRISM fast reactor as a prototype demonstration plant, to establish the basis for licensing and the cost and schedule for subsequent fully commercial IFR plants. Once demonstrated, this commercial IFR will be expected to show very significant advances in nuclear safety, reliability, nuclear fuel sustainability, management of long-term waste, proliferation resistance, and economics. The time has come to capitalize on this exceptional energy technology, with the benefits of this development extending throughout the global energy economy in the 21st century.

#### 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.

#### 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.

#### Climate change is real and anthropogenic – fundamental science, atmospheric patterns, greenhouse gas fingerprints, and newest measurements all confirm.

Karl Braganza, 6-14-2011, received his PhD from the School of Mathematics at Monash University, work has centered on understanding and attributing climate variability and change, using numerical modeling, instrumental observations and past climate evidence, currently the Head of Climate Monitoring at the Bureau of Meteorology's National Climate Center, The Conversation, "The Greenhouse Effect is Real: Here’s Why," <http://theconversation.edu.au/the-greenhouse-effect-is-real-heres-why-1515>

The greenhouse effect is fundamental science It would be easy to form the opinion that everything we know about climate change is based upon the observed rise in global temperatures and observed increase in carbon dioxide emissions since the industrial revolution. In other words, one could have the mistaken impression that the entirety of climate science is based upon a single correlation study. In reality, the correlation between global mean temperature and carbon dioxide over the 20th century forms an important, but very small part of the evidence for a human role in climate change. Our assessment of the future risk from the continued buildup of greenhouse gases in the atmosphere is even less informed by 20th century changes in global mean temperature. For example, our understanding of the greenhouse effect – the link between greenhouse gas concentrations and global surface air temperature – is based primarily on our fundamental understanding of mathematics, physics, astronomy and chemistry. Much of this science is textbook material that is at least a century old and does not rely on the recent climate record. For example, it is a scientific fact that Venus, the planet most similar to Earth in our solar system, experiences surface temperatures of nearly 500 degrees Celsius due to its atmosphere being heavily laden with greenhouse gases. Back on Earth, that fundamental understanding of the physics of radiation, combined with our understanding of climate change from the geological record, clearly demonstrates that increasing greenhouse gas concentrations will inevitably drive global warming. Dusting for climate fingerprints The observations we have taken since the start of 20th century have confirmed our fundamental understanding of the climate system. While the climate system is very complex, observations have shown that our formulation of the physics of the atmosphere and oceans is largely correct, and ever improving. Most importantly, the observations have confirmed that human activities, in particular a 40% increase in atmospheric carbon dioxide concentrations since the late 19th century, have had a discernible and significant impact on the climate system already. In the field known as detection and attribution of climate change, scientists use indicators known as fingerprints of climate change. These fingerprints show the entire climate system has changed in ways that are consistent with increasing greenhouse gases and an enhanced greenhouse effect. They also show that recent, long term changes are inconsistent with a range of natural causes. Is it getting hot in here? A warming world is obviously the most profound piece of evidence. Here in Australia, the decade ending in 2010 has easily been the warmest since record keeping began, and continues a trend of each decade being warmer than the previous, that extends back 70 years. Globally, significant warming and other changes have been observed across a range of different indicators and through a number of different recording instruments, and a consistent picture has now emerged. Scientists have observed increases in continental temperatures and increases in the temperature of the lower atmosphere. In the oceans, we have seen increases in sea-surface temperatures as well as increases in deep-ocean heat content. That increased heat has expanded the volume of the oceans and has been recorded as a rise in sea-level. Scientists have also observed decreases in sea-ice, a general retreat of glaciers and decreases in snow cover. Changes in atmospheric pressure and rainfall have also occurred in patterns that we would expect due to increased greenhouse gases. There is also emerging evidence that some, though not all, types of extreme weather have become more frequent around the planet. These changes are again consistent with our expectations for increasing atmospheric carbon dioxide. Patterns of temperature change that are uniquely associated with the enhanced greenhouse effect, and which have been observed in the real world include: greater warming in polar regions than tropical regions greater warming over the continents than the oceans greater warming of night time temperatures than daytime temperatures greater warming in winter compared with summer a pattern of cooling in the high atmosphere (stratosphere) with simultaneous warming in the lower atmosphere (troposphere).

#### Only the aff can pull us back from the edge – adequately brings down ppm amounts.

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\*\*\*

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.

#### Global warming risks collapse in biodiversity – scaling back emission solves.

Lee Hannah, 4-19-2012, is Senior Fellow in Climate Change Biology at Conservation International’s (CI) Center for Applied Biodiversity Science, tracking role of climate change in conservation planning and methods of corridor design, heads CI’s efforts to develop conservation responses to climate change, Yale Environment 360, “As Threats to Biodiversity Grow, Can We Save World’s Species?,” http://e360.yale.edu/feature/as\_threats\_to\_biodiversity\_grow\_can\_we\_save\_worlds\_species/2518/

Now, with 7 billion people on the planet — heading to 10 billion — and with greenhouse gas emissions threatening more rapid temperature rises than the warming that brought the last Ice Age to an end, the many millions of living things on Earth face an unprecedented squeeze. Is a wave of extinctions possible, and if so, what can we do about it? The late climate scientist and biologist Stephen Schneider once described this confluence of events — species struggling to adapt to rapid warming in a world heavily modified by human action — as a “no-brainer for an extinction spasm.” My colleagues Barry Brook and Anthony Barnosky recently put it this way, “We are witnessing a similar collision of human impacts and climatic changes that caused so many large animal extinctions toward the end of the Pleistocene. But today, given the greater magnitude of both climate change and other human pressures, the show promises to be a wide-screen technicolor version of the (by comparison) black-and-white letterbox drama that played out the first time around.” The magnitude of the threat was first quantified in a 2004 Nature study, “Extinction Risk from Climate Change.” This paper suggested that in six diverse regions, 15 to 37 percent of species could be at risk of extinction. If those six regions were typical of the global risk, the study’s authors later calculated, more than a million terrestrial and marine species could face extinction due to human encroachment and climate change — assuming conservatively that 10 million species exist in the world. Headlines around the world trumpeted the 1 million figure. Whether that scenario will unfold is unclear. But signs of what is to come are already all around us: nearly 100 amphibian species in South America vanishing in a disease outbreak linked to climate change, large areas of western North American facing massive die-offs of trees because of warming-driven beetle outbreaks, and increasing loss of coral reefs worldwide because of human activities and coral bleaching events driven by rising ocean temperatures. Most of the world’s biologically unique areas have already lost more than 70 percent of their high-quality habitat. The world community has the power to greatly reduce the prospect of an extinction spasm by lowering greenhouse gas emissions and launching large-scale conservation and forest preservation programs that both slow global warming and provide a sanctuary for countless species. But progress on these fronts is slow, and pressure on the world’s biodiversity remains relentless. An important part of the solution is preserving the ability of species to move across a changing landscape. Before humans, species responded to climate change by migrating, sometimes long distances, to track their preferred climatic conditions. Fully natural landscapes were conducive to these movements, with even slow-dispersing plants shifting the heart of their range on continental scales. The mechanisms of these changes are still being worked out, but we know they happened: Insects once found in Britain are now found only in the Himalayas, and centers of oak distribution have moved from the Mediterranean to Central Europe and from Georgia to Pennsylvania. Recent studies have shown that migration was an important method for species to cope with rapid climate change as far back as 55 million years ago, a period known as the Paleocene-Eocene Thermal Maximum, or PETM. Then, for reasons that are still not entirely clear, vast amounts of greenhouse gases were released into the atmosphere and oceans, leading to an increase in global temperatures of 4 to 9 degrees C (7 to 14 degrees F) in less than 10,000 years. Geological and fossil studies, using techniques such as stable isotope analysis, show major extinctions, the evolution of new animals and plants, and the migration of species on a large scale. Now, however, landscapes are crowded with human uses. Cities, urban sprawl, and agriculture take up huge areas. Freeways and roads create long linear obstructions to natural movement and present a patchwork of obstacles that are a severe challenge to species’ natural modes of shifting to track climate. To unravel these future responses requires understanding of past response, modeling of future response, and insights from changes already underway. To date, marine systems have experienced the most extensive impacts of climate change. From coral bleaching to melting sea ice, marine systems are changing on global and regional scales. Coral bleaching occurs when water temperatures exceed regional norms, causing corals to expel symbiotic micro-organisms from their tissues, ultimately leading to morbidity or death. Bleaching has exterminated some coral species from entire ocean basins. Global extinctions may follow as temperatures continue to rise. Corals face a second threat from acidification as CO2 builds up in the atmosphere and oceans, which prevents corals and many other marine organisms, including clams and oysters, from forming their calcium carbonate shells. Overall, the evidence suggests that the world’s roughly 5 million marine species face as severe threats from climate change as their terrestrial counterparts. On land, tropical biodiversity hotspots in places such as the Amazon and the rainforests of Indonesia and Malaysia are especially at risk. All global climate models now show significant future warming in the tropics, even if more muted than warming at high latitudes. Tropical animals, insects, and plants are tightly packed along climatic gradients from lowlands to mountaintops, and these organisms are sensitive to changes in temperature and rainfall. Already, scores of amphibians in South America have disappeared as a warmer, drier climate has led to outbreaks of disease such as the chytrid fungus. At the same time, large areas of tropical forest are being cleared for timber, ranching, and farming such crops as soybeans and oil palm.

#### Biodiversity loss causes extinction.

Ruth Young, 2-9-2010, Ph.D. 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.

#### Causes rampant disease spread.

Kirsten Adair, 4-22-2012, Yale Law, Yale Daily News, “Global warming may intensify disease,” <http://www.yaledailynews.com/news/2012/apr/11/global-warming-may-intensify-disease/>

\*\*\*cites Gerald Friedland, professor of medicine and epidemiology and public health at the Yale School of Medicine\*\*\*

According to several leading climate scientists and public health researchers, global warming will lead to higher incidence and more intense versions of disease. The direct or indirect effects of global warming might intensify the prevalence of tuberculosis, HIV/AIDS, dengue and Lyme disease, they said, but the threat of increased health risks is likely to futher motivate the public to combat global warming. “The environmental changes wrought by global warming will undoubtedly result in major ecologic changes that will alter patterns and intensity of some infectious diseases,” said Gerald Friedland, professor of medicine and epidemiology and public health at the Yale School of Medicine. Global warming will likely cause major population upheavals, creating crowded slums of refugees, Friedland said. Not only do areas of high population density facilitate disease transmission, but their residents are more likely to be vulnerable to disease because of malnutrition and poverty, he said. This pattern of vulnerability holds for both tuberculosis and HIV/AIDS, increasing the incidence of both the acquisition and spread of the diseases, he explained. He said these potential effects are not surprising, since tuberculosis epidemics historically have followed major population and environmental upheavals. By contrast, global warming may increase the infection rates of mosquito-borne diseases by creating a more mosquito-friendly habitat. Warming, and the floods associated with it, are like to increase rates of both malaria and dengue, a debilitating viral disease found in tropical areas and transmitted by mosquito bites, said Maria Diuk-Wasser, assistant professor of epidemiology at the Yale School of Public Health. “The direct effects of temperature increase are an increase in immature mosquito development, virus development and mosquito biting rates, which increase contact rates (biting) with humans. Indirect effects are linked to how humans manage water given increased uncertainty in the water supply caused by climate change,” Diuk-Wasser said.

#### New-type infectious disease spread causes extinction.

Victoria Yu, 5-22-2009, Dartmouth Journal of Science, “Human Extinction: The Uncertainty of Our Fate,” http://dujs.dartmouth.edu/spring-2009/human-extinction-the-uncertainty-of-our-fate

A pandemic will kill off all humans. In the past, humans have indeed fallen victim to viruses. Perhaps the best-known case was the bubonic plague that killed up to one third of the European population in the mid-14th century (7). While vaccines have been developed for the plague and some other infectious diseases, new viral strains are constantly emerging — a process that maintains the possibility of a pandemic-facilitated human extinction. Some surveyed students mentioned AIDS as a potential pandemic-causing virus. It is true that scientists have been unable thus far to find a sustainable cure for AIDS, mainly due to HIV’s rapid and constant evolution. Specifically, two factors account for the virus’s abnormally high mutation rate: 1. HIV’s use of reverse transcriptase, which does not have a proof-reading mechanism, and 2. the lack of an error-correction mechanism in HIV DNA polymerase (8). Luckily, though, there are certain characteristics of HIV that make it a poor candidate for a large-scale global infection: HIV can lie dormant in the human body for years without manifesting itself, and AIDS itself does not kill directly, but rather through the weakening of the immune system. However, for more easily transmitted viruses such as influenza, the evolution of new strains could prove far more consequential. The simultaneous occurrence of antigenic drift (point mutations that lead to new strains) and antigenic shift (the inter-species transfer of disease) in the influenza virus could produce a new version of influenza for which scientists may not immediately find a cure. Since influenza can spread quickly, this lag time could potentially lead to a “global influenza pandemic,” according to the Centers for Disease Control and Prevention (9). The most recent scare of this variety came in 1918 when bird flu managed to kill over 50 million people around the world in what is sometimes referred to as the Spanish flu pandemic. Perhaps even more frightening is the fact that only 25 mutations were required to convert the original viral strain — which could only infect birds — into a human-viable strain (10).

### 1AC spent fuel advantage

#### ADVANTAGE:\_\_ spent fuel

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

#### Environmental impact of a nuclear war.

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

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

#### The fallout would spread well beyond the U.S.

Science Daily, 5-22-2012, “Severe Nuclear Reactor Accidents Likely Every 10 to 20 Years, European Study Suggests,” <http://www.sciencedaily.com/releases/2012/05/120522134942.htm>

Subsequently, the researchers determined the geographic distribution of radioactive gases and particles around a possible accident site using a computer model that describes Earth's atmosphere. The model calculates meteorological conditions and flows, and also accounts for chemical reactions in the atmosphere. The model can compute the global distribution of trace gases, for example, and can also simulate the spreading of radioactive gases and particles. To approximate the radioactive contamination, the researchers calculated how the particles of radioactive caesium-137 (137Cs) disperse in the atmosphere, where they deposit on Earth's surface and in what quantities. The 137Cs isotope is a product of the nuclear fission of uranium. It has a half-life of 30 years and was one of the key elements in the radioactive contamination following the disasters of Chernobyl and Fukushima.The computer simulations revealed that, on average, only eight percent of the 137Cs particles are expected to deposit within an area of 50 kilometres around the nuclear accident site. Around 50 percent of the particles would be deposited outside a radius of 1,000 kilometres, and around 25 percent would spread even further than 2,000 kilometres. These results underscore that reactor accidents are likely to cause radioactive contamination well beyond national borders.

#### U.S. nuclear spent fuel storage is worse than Japan - has four times the quantity of spent fuel.

Edward Klump & Mike Lee, 3-19-2011, “Atomic Fuel Stored at U.S. Plants Poses Risks Similar to Japan Facilities,” Bloomberg, http://www.bloomberg.com/news/2011-03-19/atomic-fuel-stored-at-u-s-plants-poses-risks-similar-to-japan-facilities.html

U.S. nuclear power plants that store thousands of metric tons of spent atomic fuel pose risks of a crisis like the one unfolding in Japan, where crews are battling to prevent a meltdown of stored fuel, nuclear safety experts said. U.S. nuclear plants had an estimated 63,000 metric tons (138.9 million pounds) of spent fuel stored on site as of January 2010, according to a report from the U.S. Nuclear Regulatory Commission. About 2,000 metric tons a year is expected to be added to that total, the NRC said. The fuel, which contains uranium and radioactive byproducts, is taken from reactors and stored at least five years in water-filled cooling pools, then sometimes sealed in steel-and-concrete casks for longer-term storage. Without cooling, the spent fuel would overheat and release harmful radiation. “In the U.S., we are worse off, said David Lochbaum, a nuclear engineer for the Union of Concerned Scientists who is a former safety instructor for the NRC. ‘‘Our spent-fuel pools are more full than in Japan.’’ Storing radioactive waste has been a key sticking point in the expansion of nuclear power in the U.S. as landowners and environmental groups oppose plans for fuel dumps. A storage site at Yucca Mountain in Nevada was canceled by the Obama administration in 2009 after 20 years of planning and a cost of $9 billion.

### plan

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

### 1AC solvency

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

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

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

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

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

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

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

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

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

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

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

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

## 2AC

### spent fuel

#### Reprocessing allows for safe, disposable, proliferation resistant technology.

Gerald E. Marsh & George S. Stanford, 3-16-2006, a physicist at Argonne National Laboratory, was a consultant to the Office of the Chief of Naval Operations on strategic nuclear policy and technology for many year, and George S. Stanford is a physicist, retired from Argonne National Laboratory, he is co-author of Nuclear Shadowboxing: Contemporary Threats from Cold-War Weaponry, “Reprocessing method could allay weapons fear,” <http://www.nature.com/nature/journal/v440/n7082/full/440278d.html>

The authors also say that “Available reactor technology can provide CO2-emission-free electric power, though it poses well-known problems of waste disposal and weapons proliferation.” However, with reprocessing and fast reactors, waste disposal is almost trivial, since the radioactive toxicity of the real waste (the fission products) will be below that of the original ore in less than 500 years (2). As for proliferation, the new technique of nonaqueous pyrometallurgical reprocessing is far more proliferation-resistant than today’s policy of simply storing unreprocessed “spent” fuel (2, 4).

#### No long term radiation leakage problems – extraction of the actinides lowers the toxicity.

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>

This recommendation is based on an implicit assumption that spent nuclear fuel is a de-facto waste form destined for ultimate disposal, and that it would take a long time to develop repositories. The Study ponders whether the spent nuclear fuel is a resource or a waste. Since the Study speculates on a large supply of low-price uranium that will continue to meet rising demand for many decades, the value of spent fuel as a resource is diminished. However, there is another dimension to this equation. The actinides contained in the spent fuel are potentially a valuable resource. They are also a long-term radiological risk, and thus must be managed accordingly. Radiological toxicity here is a relative measure of the cancer risk if ingested or inhaled, which we have normalized to that of the original natural uranium ore. As mined, the ore contains uranium along with decay products that have accumulated by its (very slow) decay over millennia. Normalization to the natural uranium ore from which the spent fuel originated is a useful but somewhat arbitrary relative standard. If the radiological toxicity drops below the natural uranium ore level we would be disposing of nuclear wastes that had no greater hazard than the uranium found naturally. The point at which the radiological toxicity curve crosses the natural uranium line then can be defined (at least loosely) as an effective lifetime of the waste components. For all practical purposes, the radiological toxicity due to the fission product portion of the waste decays with (approximately) a 30 year half-life, due to the dominance of strontium and cesium isotopes. It drops below the natural uranium ore level in about 300 years, and becomes harmless in well under 1,000 years. On the other hand, the radiotoxicity level associated with the actinide portion stays far above that of natural uranium ore for a very long time, and remains at least three orders of magnitude higher than that for the fission products for hundreds of thousands of years.

### solvency

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

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

One of the issues most often mentioned when discussing sodium-cooled fast reactors—by far the type with the most reactor-years of experience worldwide—is the chemical reactivity of sodium, which burns upon contact with air (though with a very cool flame) and reacts quite dramatically upon contact with water. Yet sodium has several compelling advantages in fast-reactor operation: superior heat-exchange properties, virtually no corrosive effect on reactor components even after decades of operation, short half-life of sodium isotopes that form in the reactor vessel, etc. (see previous section). Some advocates of other systems characterize sodium’s volatility as a deal-breaker. But the intermediate loop that transfers heat from the reactor vessel to the steam generator contains only non-radioactive sodium, with the steam generator isolated in a separate structure, assuring that in the highly unlikely event of a sodium-water reaction there will be no danger to the primary system and no chance of radioactive material being involved.

### environmental managerialism/primitivism

#### The perm solves.

Thomas Rohkrämer, 2005, History and Philosophy professor at Lancaster University, How Green Were the Nazis: Martin Heidegger, National Socialism, and Environmentalism, p. 184-5

Heidegger's topic was, then, rather common, but the grounding within the framework of Heidegger's philosophy made it highly original. Whereas previous cultural critics saw technology either as a tool that humans have to learn to use properly for the right purposes or as a demonic force that threatens to enslave humankind, Heidegger broke with them over the idea of regarding either humans or technology as autonomous agents. Humans are not transcendent subjects who use technology freely as a tool, hut have been born into and shaped by the technical world. On the other hand, technology cannot be an autonomous agent either: this view, a misplaced personification, ignores the fact that humans created the technical world, that they are part of it and have developed a "technological mentality" within the process of technological modernization. If all this is the case, then we cannot study technology from the outside or step out of the technological world, because its logic is part of our fundamental thought structure. Heidegger thus maintained his argument from "The Age of the World Picture" that our whole horizon of truth is scientific and technological; consequently, we cannot "unchoose" technology, as this would involve stepping out of the life-world that is historically given to us. Our horizon of truth makes us think and act technologically; we may work on realizing the limitations of this perspective, which Heidegger came to regard as imposing a partial blindness, and on altering this way of seeing the world, but we cannot simply step out of it.

#### Weighing consequences is inevitable even in a deontological frameworks.

Joshua Green, November 2002, Assistant Professor Department of Psychology Harvard University, The Terrible, Horrible, No Good, Very Bad Truth About Morality And What To Do About It, p. 314

Some people who talk of balancing rights may think there is an algorithm for deciding which rights take priority over which. If that’s what we mean by 302 “balancing rights,” then we are wise to shun this sort of talk. Attempting to solve moral problems using a complex deontological algorithm is dogmatism at its most esoteric, but dogmatism all the same. However, it’s likely that when some people talk about “balancing competing rights and obligations” they are already thinking like consequentialists in spite of their use of deontological language. Once again, what deontological language does best is express the thoughts of people struck by strong, emotional moral intuitions: “It doesn’t matter that you can save five people by pushing him to his death. To do this would be a violation of his rights!”19 That is why angry protesters say things like, “Animals Have Rights, Too!” rather than, “Animal Testing: The Harms Outweigh the Benefits!” Once again, rights talk captures the apparent clarity of the issue and absoluteness of the answer. But sometimes rights talk persists long after the sense of clarity and absoluteness has faded. One thinks, for example, of the thousands of children whose lives are saved by drugs that were tested on animals and the “rights” of those children. One finds oneself balancing the “rights” on both sides by asking how many rabbit lives one is willing to sacrifice in order to save one human life, and so on, and at the end of the day one’s underlying thought is as thoroughly consequentialist as can be, despite the deontological gloss. And what’s wrong with that? Nothing, except for the fact that the deontological gloss adds nothing and furthers the myth that there really are “rights,” etc. Best to drop it. When deontological talk gets sophisticated, the thought it represents is either dogmatic in an esoteric sort of way or covertly consequentialist.

#### We must reject environmental criticism – action on environmental scenario is necessary.

Eric Reitan, December 1998, Seattle University Writer for the Electronic Green Journal, Pragmatism, Environmental World Views, and Sustainability

With the urgency of the current environmental crisis, we cannot afford to get bogged down in theoretic disputes that mask a common mission and get in the way of making the practical changes that are so pressing. Pragmatic Mediation of Deep Ecology and Christian Stewardship The example I have chosen to discuss is the theoretic debate between two environmental philosophies that have emerged in the last few decades: the philosophy of stewardship that has evolved in Christian communities, and the philosophy of deep ecology. I choose these two not on the basis of any special status they have, but rather because they are the two environmental perspectives with which I have the most personal acquaintance, and because the nature of the debate between them usefully illustrates the value of using pragmatic principles to guide theoretic environmental discourse. Before applying pragmatic principles to this example, some preliminary comments may be helpful. First, it is important to keep in mind that complex worldviews or philosophical systems may impact more than one domain of human life, and that they may have radically opposing pragmatic implications in one or more of those domains while implying substantially the same behaviors in the domain of the human-nature relationship. In such a case, we can say that while the worldviews do not have the same pragmatic meaning overall, they have the same environmental meaning. As such, it is important not to let the real differences in other areas mask the genuine agreement in the environmental domain. Second, it is worth noting that there is almost certainly more than one human social arrangement that harmonizes sustainable with the natural environment. Put another way, there is more than one set of human practices that works in terms of promoting a healthy human-natural system. And it follows from this observation that more than one worldview can be pragmatically true: while two worldviews may imply environmental behaviors that are different, and hence have a different pragmatic meaning, insofar as they both promote sustainable behaviors they are both true from a pragmatic standpoint. Pragmatic truth is not monistic, but pluralistic. Given the urgent pragmatic goals of environmental philosophy, sustained theoretic debates about meaning differences of this sort appear to be unwarranted, and should be put aside in favor of the task of finding practical ways of integrating and accommodating those alternative social arrangements which serve the common goal of sustainable human-natural systems.

#### Deliberative policymaking through debate over nuclear power is the crucial to solving the environment - reflecting as a critical intellectual is not enough.

Marian Herbick & Jon Isham, October 2010, Marian Herbick is a senior at the University of Vermont, where she is studying natural resource planning and wildlife biology, member of the Rubenstein School of Environment and Natural Resources and the Honors College, Jon Isham, department of economics and the program in environmental studies at Middlebury College. teaches in environmental economics, environmental policy, introductory microeconomics, social capital in Vermont, and global climate change, “The Promise of Deliberative Democracy,” <http://www.thesolutionsjournal.com/node/775>

Getting to 350 parts per million CO2 in the atmosphere will require massive investments in clean-energy infrastructure—investments that can too often be foiled by a combination of special interests and political sclerosis. Take the recent approval of the Cape Wind project by the U.S. Department of the Interior. In some ways, this was great news for clean-energy advocates: the project’s 130 turbines will produce, on average, 170 megawatts of electricity, almost 75 percent of the average electricity demand for Cape Cod and the islands of Martha’s Vineyard and Nantucket.1 But, because of local opposition by well-organized opponents, the approval process was lengthy, costly, and grueling —and all for a project that will produce only 0.04 percent of the total (forecasted) U.S. electricity demand in 2010.2,3 Over the next few decades, the world will need thousands of large-scale, low-carbon electricity projects—wind, solar, and nuclear power will certainly be in the mix. But if each faces Cape Wind–like opposition, getting to 350 is unlikely. How can the decision-making process about such projects be streamlined so that public policy reflects the view of a well-informed majority, provides opportunities for legitimate critiques, but does not permit the opposition to retard the process indefinitely? One answer is found in a set of innovative policy-making tools founded on the principle of deliberative democracy, defined as “decision making by discussion among free and equal citizens.”4 Such approaches, which have been developed and led by the Center for Deliberative Democracy (cdd.stanford.edu), America Speaks ([www.americaspeaks.org](http://www.americaspeaks.org/)), and the Consensus Building Institute (cbuilding.org), among others, are gaining popularity by promising a new foothold for effective citizen participation in the drive for a clean-energy future. Deliberative democracy stems from the belief that democratic leadership should involve educating constituents about issues at hand, and that citizens may significantly alter their opinions when faced with information about these issues. Advocates of the approach state that democracy should shift away from fixed notions toward a learning process in which people develop defensible positions.5 While the approaches of the Center for Deliberative Democracy, America Speaks, and the Consensus Building Institute do differ, all of these deliberative methodologies involve unbiased sharing of information and public-policy alternatives with a representative set of citizens; a moderated process of deliberation among the selected citizens; and the collection and dissemination of data resulting from this process. For example, in the deliberative polling approach used by the Center for Deliberative Democracy, a random selection of citizens is first polled on a particular issue. Then, members of the poll are invited to gather at a single place to discuss the issue. Participants receive balanced briefing materials to review before the gathering, and at the gathering they engage in dialogue with competing experts and political leaders based on questions they develop in small group discussions. After deliberations, the sample is asked the original poll questions, and the resulting changes in opinion represent the conclusions that the public would reach if everyone were given the opportunity to become more informed on pressing issues.6 If policymakers look at deliberative polls rather than traditional polls, they will be able to utilize results that originate from an informed group of citizens. As with traditional polls, deliberative polls choose people at random to represent U.S. demographics of age, education, gender, and so on. But traditional polls stop there, asking the random sample some brief, simple questions, typically online or over the phone. However, participants of deliberative polls have the opportunity to access expert information and then talk with one another before voting on policy recommendations. The power of this approach is illustrated by the results of a global deliberative process organized by World Wide Views on Global Warming ([www.wwviews.org](http://www.wwviews.org/)), a citizen’s deliberation organization based in Denmark.7 On September 26, 2009, approximately 4,000 people gathered in 38 countries to consider what should happen at the UN climate change negotiations in Copenhagen (338 Americans met in five major cities). The results derived from this day of deliberation were dramatic and significantly different from results of traditional polls. Overall, citizens showed strong concern about global warming and support for climate-change legislation, contrary to the outcomes of many standard climate-change polls. Based on the polling results from these gatherings, 90 percent of global citizens believe that it is urgent for the UN negotiations to produce a new climate change agreement; 88 percent of global citizens (82 percent of U.S. citizens) favor holding global warming to within 2 degrees Celsius of pre-industrial levels; and 74 percent of global citizens (69 percent of U.S. citizens) favor increasing fossil-fuel prices in developed countries. However, a typical news poll that was conducted two days before 350.org’s International Day of Climate Action on October 24, 2009, found that Americans had an overall declining concern about global warming.7 How can deliberative democracy help to create solutions for the climate-change policy process, to accelerate the kinds of policies and public investments that are so crucial to getting the world on a path to 350? Take again the example of wind in the United States. In the mid-1990s, the Texas Public Utilities Commission (PUC) launched an “integrated resource plan” to develop long-term strategies for energy production, particularly electricity.8 Upon learning about the deliberative polling approach of James Fishkin (then at the University of Texas at Austin), the PUC set up deliberative sessions for several hundred customers in the vicinity of every major utility provider in the state. The results were a surprise: it turned out that participants ranked reliability and stability of electricity supply as more important characteristics than price. In addition, they were open to supporting renewable energy, even if the costs slightly exceeded fossil-fuel sources. Observers considered this a breakthrough: based on these public deliberations, the PUC went on to champion an aggressive renewable portfolio standard, and the state has subsequently experienced little of the opposition to wind-tower siting that has slowed development in other states.8 By 2009, Texas had 9,500 megawatts of installed wind capacity, as much as the next six states (ranked by wind capacity) in the windy lower and upper Midwest (Iowa, Minnesota, Colorado, North Dakota, Kansas, and New Mexico).9 Deliberative democracy has proven effective in a wide range of countries and settings. In the Chinese township of Zeguo, a series of deliberative polls has helped the Local People’s Congress (LPC) to become a more effective decision-making body.10 In February 2008, 175 citizens were randomly selected to scrutinize the town’s budget—and 60 deputies from the LPC observed the process. After the deliberations, support decreased for budgeting for national defense projects, while support rose for infrastructure (e.g., rural road construction) and environmental protection. Subsequently, the LPC increased support for environmental projects by 9 percent.10 In decades to come, China must be at the forefront of the world’s investments in clean-energy infrastructure. The experience of Zeguo, if scaled up and fully supported by Chinese leaders, can help to play an important role. Deliberative democracy offers one solution for determining citizen opinions, including those on pressing issues related to climate change and clean energy. If democracy is truly about representing popular opinion, policymakers should seek out deliberative polls in their decision-making process.

#### Their cards don’t assume the world of the aff – IFRs transform economic and geopolitical paradigms – creating new methods of sustainable consumption.

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.

#### The move to stop and re-examine is ethically bankrupt.

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. 124

This is illustrative of a general disconnect between scientific progress and the evolution of social consciousness. The advances of science seem to have outpaced humanity’s ability to adapt. Rather than encouraging people to examine pressing issues with logic and reason, an antagonistic anti-intellectualism has taken hold of many, certainly in America at least. So we find ourselves on the horns of a dilemma. On the one hand we have the seemingly unstoppable march of science, and on the other an anachronistic mindset more suited to life in the Dark Ages. The ensuing problems are exacerbated by the sheer volume of people on the planet, and that number is rising with appalling speed, lending an urgency to our environmental problems that might otherwise be somewhat postponed. Yet who is prepared to forgo the benefits of modern medicine in order to bring the critical population portion of our dilemma under control? This is not to say that many people wouldn’t be perfectly happy—or at least willfully oblivious—to withholding modern124medicine from others in geographically and culturally distant lands. Such an execrably inhumane attitude confronted me when I founded a nonprofit organization some years ago with the intention of drilling water wells in poor villages to prevent the dreadful rates of mortality from waterborne disease. I was frankly aghast at the number of seemingly normal people who, in one way or another, cast doubt upon the advisability of preventing the needless deaths of children in underdeveloped countries lest they survive to reproductive age and only add to our population dilemma. Let it be said that those who are unwilling to forgo the benefits of modern medicine, electricity, air travel, safe food and water, and all the other fruits of technology have no right to expect others to deny themselves those same things simply by dint of their nation of birth. Indeed, the well-documented link between an improvement in standard of living and population self-control would more logically lead us to attempt to spread both education and modernity to all corners of the earth. Such a course of action would most effectively address the population growth that is arguably one of the greatest developing crises in the history of our planet. It is the height of selfishness to countenance consigning billions of people to an inferior life so that the “civilized” nations can greedily pillage the world’s resources. Such a position, besides being ethically unconscionable, is based on outmoded thinking, as will be made clear in the pages to follow.

#### Nuclear energy is the perfect substitute for energy management – abdicating energy manipulation otherwise won’t happen.

Charles E. Till & Yoon Il Chang, 2011, longtime Associate Laboratory Director for Engineering Research at Argonne National Laboratory, directed civilian nuclear power reactor development at Argonne National Laboratory, PhD Engineering, Specialty Reactor Physics, Imperial College, University of London, National Research Council of Canada, United Kingdom Atomic Energy Authority , Fellow of the American Nuclear Society, awarded the Walker Cisler Medal, National Academy of Engineering, was at Argonne National Laboratory, General Manager of the Integral Fast Reactor Program, Associate Laboratory Director for Engineering Research, Interim Laboratory Director, Argonne Distinguished Fellow, Currently he also serves as the Chair of IAEA’s Technical Working Group on Nuclear Fuel Cycle Options and Spent Fuel Management, was awarded the U.S. Department of Energy’s prestigious E.O. Lawrence Award, a Fellow and a recipient of the Walker Cisler Medal of American Nuclear Society, M.E. in Nuclear Engineering from Texas A&M University, and his Ph.D. in Nuclear Science from The University of Michigan, Science Council for Global Initiatives (SCGI), Plentiful Energy: The Story of the Integral Fast Reactor, p. 99, Amazon.com

A failure to begin now to reduce reliance on coal will mean much greater economic hardship when the peak arrives. World fossil energy will begin to decline very soon, and there is no perfect substitute. The climate modelers and anti-nuclear activists will always point to policies with mandatory energy curtailment and societal adjustment to lower consumption levels. Policies such as these impact everything—agriculture, transport, trade, urban design, and national electrical grid systems—and everything dependent on them, including global telecommunications. Substitution of nuclear for fossil fuels is perfect for electricity. For transportation, agriculture, and other motive usages it is not—but electricity is energy and energy can be used in any number of innovative ways. No energy is no option. Will America willingly return to the simple agrarian ways dreamed by many in the environmental movement? This idea is influential in thinking today, while all forms of energy at least in this country are abundant, but will it withstand real scarcity? An America willingly retreating into the Middle Ages for lack of energy, while China builds itself in to an industrial powerhouse. Does this seem even remotely likely? Those who project with apparent satisfaction very limited nuclear power for America while all depleting resources show an increasing inability to sustain their historical role often have real political influence. They must face these facts. Will they?

#### Ours is the only effective engagement with energy policy.

Carol J. Hager, 1992, professor of political science at Bryn Mawr College, Democratizing Technology: Citizen & State in West German Energy Politics, 1974-1990,” Polity, JSTOR

During this phase, the citizen initiative attempted to overcome its defensive posture and implement an alternative politics. The strategy of legal and technical challenge might delay or even prevent plant construction, but it would not by itself accomplish the broader goal on the legitimation dimension, i.e., democratization. Indeed, it worked against broad participation. The activists had to find a viable means of achieving change. Citizens had proved they could contribute to a substantive policy discussion. Now, some activists turned to the parliamentary arena as a possible forum for an energy dialogue. Until now, parliament had been conspicuously absent as a relevant policy maker, but if parliament could be reshaped and activated, citizens would have a forum in which to address the broad questions of policy-making goals and forms. They would also have an institutional lever with which to pry apart the bureaucracy and utility. None of the established political parties could offer an alternative program. Thus, local activists met to discuss forming their own voting list. These discussions provoked internal dissent. Many citizen initiative members objected to the idea of forming a political party. If the problem lay in the role of parliament itself, another political party would not solve it. On the contrary, parliamentary participation was likely to destroy what political innovations the extraparliamentary movement had made. Others argued that a political party would give the movement an institutional platform from which to introduce some of the grassroots democratic political forms the groups had developed. Founding a party as the parliamentary arm of the citizen movement would allow these groups to play an active, critical role in institutionalized politics, participating in the policy debates while retaining their outside perspective. Despite the disagreements, the Alternative List for Democracy and Environmental Protection Berlin (AL) was formed in 1978 and first won seats in the Land parliament with 7.2 percent of the vote in 1981.43 The founders of the AL were encouraged by the success of newly formed local green parties in Lower Saxony and Hamburg,44 whose evolution had been very similar to that of the West Berlin citizen move-ment. Throughout the FRG, unpopular administrative decisions affect-ing local environments, generally in the form of state-sponsored indus-trial projects, prompted the development of the citizen initiative and ecology movements. The groups in turn focused constant attention on state planning "errors," calling into question not only the decisions themselves, but also the conventional forms of political decision making that produced them.45 Disgruntled citizens increasingly aimed their critique at the established political parties, in particular the federal SPD/ FDP coalition, which seemed unable to cope with the economic, social, and political problems of the 1970s. Fanned by publications such as the Club of Rome's report, "The Limits to Growth," the view spread among activists that the crisis phenomena were not merely a passing phase, but indicated instead "a long-term structural crisis, whose cause lies in the industrial-technocratic growth society itself."46 As they broadened their critique to include the political system as a whole, many grassroots groups found the extraparliamentary arena too restrictive. Like many in the West Berlin group, they reasoned that the necessary change would require a degree of political restructuring that could only be accomplished through their direct participation in parliamentary politics. Green/alternative parties and voting lists sprang up nationwide and began to win seats in local assemblies. The West Berlin Alternative List saw itself not as a party, but as the parliamentary arm of the citizen initiative movement. One member explains: "the starting point for alternative electoral participation was simply the notion of achieving a greater audience for [our] own ideas and thus to work in support of the extraparliamentary movements and initia-tives,"47 including non-environmentally oriented groups. The AL wanted to avoid developing structures and functions autonomous from the citizen initiative movement. Members adhered to a list of principles, such as rotation and the imperative mandate, designed to keep parliamentarians attached to the grassroots. Although their insistence on grassroots democracy often resulted in interminable heated discussions, the participants recognized the importance of experimenting with new forms of decision making, of not succumbing to the same hierarchical forms they were challenging. Some argued that the proper role of citizen initiative groups was not to represent the public in government, but to mobilize other citizens to participate directly in politics themselves; self-determination was the aim of their activity.48 Once in parliament, the AL proposed establishmento f a temporary parliamentaryco mmissiont o studye nergyp olicy,w hichf or the first time would draw all concernedp articipantst ogetheri n a discussiono f both short-termc hoicesa nd long-termg oals of energyp olicy. With help from the SPD faction, which had been forced into the opposition by its defeat in the 1981 elections, two such commissions were created, one in 1982-83 and the other in 1984-85.49T hese commissionsg ave the citizen activists the forum they sought to push for modernizationa nd technicali nnovation in energy policy. Although it had scaled down the proposed new plant, the utility had produced no plan to upgrade its older, more polluting facilities or to install desulfurizationd evices. With proddingf rom the energyc ommission, Land and utility experts began to formulate such a plan, as did the citizen initiative. By exposing administrative failings in a public setting, and by producing a modernization plan itself, the combined citizen initiative and AL forced bureaucratic authorities to push the utility for improvements . They also forced the authorities to consider different technological solutions to West Berlin's energy and environmental problems. In this way, the activists served as technological innovators. In 1983, the first energy commission submitted a list of recommendations to the Land parliament which reflected the influence of the citizen protest movement. It emphasized goals of demand reduction and efficiency, noted the value of expanded citizen participation and urged authorities to "investigate more closely the positive role citizen participation can play in achieving policy goals."50 The second energy commission was created in 1984 to discuss the possibilities for modernization and shutdown of old plants and use of new, environmentally friendlier and cheaper technologies for electricity and heat generation. Its recommendations strengthened those of the first commission.51 Despite the non-binding nature of the commissions' recommendations, the public discussion of energy policy motivated policy makers to take stronger positions in favor of environmental protection. III. Conclusion The West Berlin energy project eventually cleared all planning hurdles, and construction began in the early 1980s. The new plant now conforms to the increasingly stringent environmental protection requirements of the law. The project was delayed, scaled down from 1200 to 600 MW, moved to a neutral location and, unlike other BEWAG plants, equipped with modern desulfurization devices. That the new plant, which opened in winter 1988-89, is the technologically most advanced and environmen-tally sound of BEWAG's plants is due entirely to the long legal battle with the citizen initiative group, during which nearly every aspect of the original plans was changed. In addition, through the efforts of the Alter-native List (AL) in parliament, the Land government and BEWAG formulated a long sought modernization and environmental protection plan for all of the city's plants. The AL prompted the other parliamentary parties to take pollution control seriously. Throughout the FRG, energy politics evolved in a similar fashion. As Habermas claimed, underlying the objections against particular projects was a reaction against the administrative-economic system in general. One author, for example, describes the emergence of two-dimensional protest against nuclear energy: The resistance against a concrete project became understood simul-taneously as resistance against the entire atomic program. Questions of energy planning, of economic growth, of understanding of democracy entered the picture. . . . Besides concern for human health, for security of conditions for human existence and protec-tion of nature arose critique of what was perceived as undemocratic planning, the "shock" of the delayed public announcement of pro-ject plans and the fear of political decision errors that would aggra-vate the problem.52 This passage supports a West Berliner's statement that the citizen initiative began with a project critique and arrived at Systemkritik.53 I have labeled these two aspects of the problem the public policy and legitima-tion dimensions. In the course of these conflicts, the legitimation dimen-sion emergd as the more important and in many ways the more prob-lematic. Parliamentary Politics In the 1970s, energy politics began to develop in the direction Offe de-scribed, with bureaucrats and protesters avoiding the parliamentary channels through which they should interact. The citizen groups them-selves, however, have to a degree reversed the slide into irrelevance of parliamentary politics. Grassroots groups overcame their defensive posture enough to begin to formulate an alternative politics, based upon concepts such as decision making through mutual understanding rather than technical criteria or bargaining. This new politics required new modes of interaction which the old corporatist or pluralist forms could not provide. Through the formation of green/alternative parties and voting lists and through new parliamentary commissions such as the two described in the case study, some members of grassroots groups attempted to both operate within the political system and fundamentally change it, to restore the link between bureaucracy and citizenry. Parliamentary politics was partially revived in the eyes of West German grassroots groups as a legitimate realm of citizen participation, an outcome the theory would not predict. It is not clear, however, that strengthening the parliamentary system would be a desirable outcome for everyone. Many remain skeptical that institutions that operate as part of the "system" can offer the kind of substantive participation that grass-roots groups want. The constant tension between institutionalized politics and grassroots action emerged clearly in the recent internal debate between "fundamentalist" and "realist" wings of the Greens. Fundis wanted to keep a firm footing outside the realm of institutionalized politics. They refused to bargain with the more established parties or to join coalition governments. Realos favored participating in institutionalized politics while pressing their grassroots agenda. Only this way, they claimed, would they have a chance to implement at least some parts of their program. This internal debate, which has never been resolved, can be interpreted in different ways. On one hand, the tension limits the appeal of green and alternative parties to the broader public, as the Greens' poor showing in the December 1990 all-German elections attests. The failure to come to agreement on basic issues can be viewed as a hazard of grass-roots democracy. The Greens, like the West Berlin citizen initiative, are opposed in principle to forcing one faction to give way to another. Disunity thus persists within the group. On the other hand, the tension can be understood not as a failure, but as a kind of success: grassroots politics has not been absorbed into the bureaucratized system; it retains its critical dimension, both in relation to the political system and within the groups themselves. The lively debate stimulated by grassroots groups and parties keeps questions of democracy on the public agenda. Technical Debate In West Berlin, the two-dimensionality of the energy issue forced citizen activists to become both participants in and critics of the policy process. In order to defeat the plant, activists engaged in technical debate. They won several decisions in favor of environmental protection, often proving to be more informed than bureaucratic experts themselves. The case study demonstrates that grassroots groups, far from impeding techno-logical advancement, can actually serve as technological innovators. The activists' role as technical experts, while it helped them achieve some success on the policy dimension, had mixed results on the legitimation dimension. On one hand, it helped them to challenge the legitimacy of technocratic policy making. They turned back the Land government's attempts to displace political problems by formulating them in technical terms.54 By demonstrating the fallibility of the technical arguments, activists forced authorities to acknowledge that energy demand was a political variable, whose value at any one point was as much influenced by the choices of policy makers as by independent technical criteria. Submission to the form and language of technical debate, however, weakened activists' attempts to introduce an alternative, goal-oriented form of decision making into the political system. Those wishing to par-ticipate in energy politics on a long-term basis have had to accede to the language of bureaucratic discussion, if not the legitimacy of bureaucratic authorities. They have helped break down bureaucratic authority but have not yet offered a viable long-term alternative to bureaucracy. In the tension between form and language, goals and procedure, the legitima-tion issue persists. At the very least, however, grassroots action challenges critical theory's notion that technical discussion is inimical to democratic politics.55 Citizen groups have raised the possibility of a dialogue that is both technically sophisticated and democratic. In sum, although the legitimation problems which gave rise to grass-roots protest have not been resolved, citizen action has worked to counter the marginalization of parliamentary politics and the technocratic character of policy debate that Offe and Habermas identify. The West Berlin case suggests that the solutions to current legitimation problems may not require total repudiation of those things previously associated with technocracy.56 In Berlin, the citizen initiative and AL continue to search for new, more legitimate forms of organization consistent with their principles. No permanent Land parliamentary body exists to coordinate and con-solidate energy policy making.57 In the 1989 Land elections, the CDU/ FDP coalition was defeated, and the AL formed a governing coalition with the SPD. In late 1990, however, the AL withdrew from the coali-tion. It remains to be seen whether the AL will remain an effective vehi-cle for grassroots concerns, and whether the citizenry itself, now includ-ing the former East Berliners, will remain active enough to give the AL direction as united Berlin faces the formidable challenges of the 1990s. On the policy dimension, grassroots groups achieved some success. On the legitimation dimension, it is difficult to judge the results of grass-roots activism by normal standards of efficacy or success. Activists have certainly not radically restructured politics. They agree that democracy is desirable, but troublesome questions persist about the degree to which those processes that are now bureaucratically organized can and should be restructured, where grassroots democracy is possible and where bureaucracy is necessary in order to get things done. In other words, grassroots groups have tried to remedy the Weberian problem of the marginalization of politics, but it is not yet clear what the boundaries of the political realm should be. It is, however, the act of calling existing boundaries into question that keeps democracy vital. In raising alternative possibilities and encouraging citizens to take an active, critical role in their own governance, the contribution of grassroots environmental groups has been significant. As Melucci states for new social movements in general, these groups mount a "symbolic" challenge by proposing "a different way of perceiving and naming the world."58 Rochon concurs for the case of the West German peace movement, noting that its effect on the public discussion of secur-ity issues has been tremendous.59 The effects of the legitimation issue in the FRG are evident in increased citizen interest in areas formerly left to technical experts. Citizens have formed nationwide associations of environmental and other grassroots groups as well as alternative and green parties at all levels of government. The level of information within the groups is generally quite high, and their participation, especially in local politics, has raised the awareness and engagement of the general populace noticeably.60 Policy concessions and new legal provisions for citizen participation have not quelled grassroots action. The attempts of the established political parties to coopt "green" issues have also met with limited success. Even green parties themselves have not tapped the full potential of public support for these issues. The persistence of legitima-tion concerns, along with the growth of a culture of informed political activism, will ensure that the search continues for a space for a delibera-tive politics in modern technological society.61

#### Their cards don’t assume the world of the aff – IFRs transform economic and geopolitical paradigms – creating new methods of sustainable consumption.

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.

#### Their authors ignore the status of the world now.

John Foster, 2011, professor of sociology at the University of Oregon, Editor of Monthly Review, “Capitalism and Degrowth: An Impossibility Theorem,” http://monthlyreview.org/2011/01/01/capitalism-and-degrowth-an-impossibility-theorem

The notion that degrowth as a concept can be applied in essentially the same way both to the wealthy countries of the center and the poor countries of the periphery represents a category mistake resulting from the crude imposition of an abstraction (degrowth) on a context in which it is essentially meaningless, e.g., Haiti, Mali, or even, in many ways, India. The real problem in the global periphery is overcoming imperial linkages, transforming the existing mode of production, and creating sustainable-egalitarian productive possibilities. It is clear that many countries in the South with very low per capita incomes cannot afford degrowth but could use a kind of sustainable development, directed at real needs such as access to water, food, health care, education, etc. This requires a radical shift in social structure away from the relations of production of capitalism/imperialism. It is telling that in Latouche’s widely circulated articles there is virtually no mention of those countries, such as Cuba, Venezuela, and Bolivia, where concrete struggles are being waged to shift social priorities from profit to social needs. Cuba, as the Living Planet Report has indicated, is the only country on Earth with high human development and a sustainable ecological footprint.20 It is undeniable today that economic growth is the main driver of planetary ecological degradation. But to pin one’s whole analysis on overturning an abstract “growth society” is to lose all historical perspective and discard centuries of social science.

#### Psychological ties to supply and demand ensures the alternative will cause conflict.

Alejandro Nadal, 2010, Professor at the Centre for Economic Studies of El Colegio de Mexico, “Is De-Growth Compatible With Capitalism?,” <http://triplecrisis.com/is-de-growth-compatible-with-capitalism/>

The problem with this perspective is that the cause of growth becomes psychological, a question of mentalities and even fashion. The idea that growth could originate from endogenous forces in capitalist economies is ignored. Growth is not only a cultural phenomenon or a feature of a maniac mentality. It is the direct consequence of how capitalist economies operate. This is true of capitalism as it operated in Genoa in the sixteenth century, and it is true today with the mega-corporations that rule global markets. The purpose of capital is to produce profits without end, that’s the meaning of its particular form of circulation. Its purpose is not to produce useful things or useless stuff, its object is to produce profits without end and produce more capital. This is the engine of accumulation and it is fuelled by inter-capitalist competition. In the words of Marx’s Grundrisse, “Conceptually, competition is nothing other than the inner nature of capital, its essential character, appearing in and realized as the reciprocal interaction of many capitals with one another, the inner tendency [presents itself] as external necessity. Capital exists and can only exist as many capitals, and its self-determination therefore appears as their reciprocal interaction with one another.” By the forces of competition, “capital is continuously harassed: March! March!” Thus, Marx’s analysis shows convincingly that capital can only exist as private centres of accumulation that are driven by (inter-capitalist) competition. This is why, in its quest to expand and survive (as an independent centre of accumulation) capital is continuously opening new spaces for profitability: new products, new markets. The corollary of this is that the only way in which we can get rid of “growth mania” is by getting rid of capitalism. It is not possible to have capitalism without growth. Is there a technological fix out of this? In other words, can we have such an efficient technological infrastructure (in buildings, energy and transport systems, manufacturing, etc.) that even with growth the ecological footprint could be reduced? This remains to be seen, but one phenomenon seems to conspire against this: the rebound effect. As technologies become more efficient and unit costs become smaller, consumption increases. Either existing consumers deepen their consumption, or more people have access to the objects or services being put on the marketplace. The end result is that the positive effects of greater efficiency are cancelled by deepening consumption rates. And let’s not forget what happens when consumption stops or slows down: those centres of accumulation cannot sell their commodities, inventories grow, unemployment soars and we have recessions, depressions and crises. From the side of production, for those individual centres of accumulation every gadget, every nook and cranny in the world, or any vast expanse of geographical space is a space waiting to be occupied for profits. From pep pills to tranquilizers, food and water, health and even genetic resources or nano-materials, to the anxious eyes of capital all of these dimensions are but spaces for profitability. Talk about investing in “natural capital” as a way out to the dilemma is devoid of any sense. It could very well be that, in the words of Richard Smith we either save capitalism or save ourselves, we cannot do both.

#### Managerialism is key to prevent extinction.

Neil Levy, 1999, fellow of the Centre for Applied Philosophy and Public Ethics at Charles Sturt University, “Discourses of the Environment,” p. 215

If the ‘technological fix’ is unlikely to be more successful than strategies of limitation of our uses of resources, we are nevertheless unable to simply leave the environment as it is. There is a real and pressing need for more, and more accurate, technical and scientific information about the non-human world. For we are faced with a situation in which the processes we have already set in train will continue to impact upon that world, and therefore us, for centuries. It is therefore necessary, not only to stop cutting down the rain forests, but to develop real, concrete proposals for action, to reverse, or at least limit, the effects of our previous interventions. Moreover, there is another reason why our behaviour towards the non-human cannot simply be a matter of leaving it as it is, at least in so far as our goals are not only environmental but also involve social justice. For if we simply preserve what remains to us of wilderness, of the countryside and of park land, we also preserve patterns of very unequal access to their resources and their consolations (Soper 1995: 207). In fact, we risk exacerbating these inequalities. It is no us, but the poor of Brazil, who will bear the brunt of the misery which would result form a strictly enforced policy of leaving the Amazonian rain forest untouched, in the absence of alternative means of providing for their livelihood. It is the development of policies to provide such ecologically sustainable alternative which we require, as well as the development of technical means for replacing our current greenhouse gas-emitting sources of energy. Such policies and proposals for concrete action must be formiulated by ecologists, environmentalist, people with expertise concerning the functioning of ecosystems and the impacts which our actions have upon them. Such proposals are, therefore, very much the province for Foucault’s specific intellectual, the one who works ‘within specific sectors, at the precise points where their won conditions of life or work situate them’ (Foucault 1980g: 126). For who could be more fittingly described as ‘the strategists of life and death’ than these environmentalists? After the end of the Cold War, it is in this sphere, more than any other, that man’s ‘politics places his existence as a living being in question’ (Foucault 1976: 143). For it is in facing the consequences of our intervention in the non-human world that the fate of our species, and of those with whone we share this planet, will be decided.

#### The alternative can’t solve – it gets rolled back.

George Kateb, 1997, William Nelson Cromwell Professor of Politics, Emeritus, at Princeton University, “Technology and Society,” Social research Vol. 64 Issue 3

But the question arises as to where a genuine principle of limitation on technological endeavor would come from. It is scarcely conceivable that Western humanity – and by now most of humanity , because of their pleasures and interests and theor won passions and desires and motives – would halt the technological project. Even if, by some change of heart, Western humanity could adopt an alterned relation to reality and human beings, how could it be enforced and allowed to yield its effects? The technological project can only be stopped by some global catastrophe that it had helped or cause or was powerless to avoid. Heidegger’s teasing invocation of the idea that a saving remedy grows with the worst danger is useless. In any case, no one would want the technological project halted, if the only way was a global catastrophe. Perhaps even the survivors would not want to block it reemergence.

#### Environmental security is key to address climate change – only way solve the advantage.

Jeffrey Mazo, March 2010, PhD in Paleoclimatology from UCLA, Managing Editor, Survival and Research Fellow for Environmental Security and Science Policy at the International Institute for Strategic Studies in London, “Climate Conflict: How global warming threatens security and what to do about it,” p. 12-3

The expected consequences of climate change include rising sea levels and population displacement, increasing severity of typhoons and hurricanes, droughts, floods, disruption of water resources, extinctions and other ecological disruptions, wild- fires, severe disease outbreaks, and declining crop yields and food stocks. Combining the historical precedents with current thinking on state stability, internal conflict and state failure suggests that adaptive capacity is the most important factor in avoiding climate-related instability. Specific global and regional climate projections for the next three decades, in light of other drivers of instability and state failure, help identify regions and countries which will see an increased risk from climate change. They are not necessarily the most fragile states, nor those which face the greatest physical effects of climate change. The global security threat posed by fragile and failing states is well known. It is in the interest of the world’s more affluent countries to take measures both to reduce the degree of global warming and climate change and to cushion the impact in those parts of the world where climate change will increase that threat. Neither course of action will be cheap, but inaction will be costlier. Efficient targeting of the right kind of assistance where it is most needed is one way of reducing the cost, and understanding how and why different societies respond to climate change is one way of making that possible.

#### Green is guiltier of hyperbole.

Ben Heard, 3-28-2012, is Director of Adelaide-based advisory firm ThinkClimate Consulting, a Masters graduate of Monash University in Corporate Environmental Sustainability, and a member of the TIA Environmental and Sustainability Action Committee, after several years with major consulting firms, founded ThinkClimate and has since assisted a range of government, private and not-for profit organisations to measure, manage and reduce their greenhouse gas emissions and move towards more sustainable operations, Decarbonise SA, “IQ2 Debate: “We’ve seen the energy,” <http://bravenewclimate.com/2012/03/28/jim-green-hatchet-man/>

Publicly accusing someone of spreading misinformation is a serious charge. Anyone doing so should make sure their own house is in order first. This time, my questions for Green are as follows: How much of your work depends on “very preliminary order of magnitude guesstimates?” Are you aware that your own reference warns against the very serious consequences of the misunderstanding of radiation risk? If so, why have you contributed to the problem? If not, why not? Do you not read references completely? Green’s misuse and abuse of references, whether the result of laziness or something worse, leave him with little credibility. This does not stop him and others continuing to make great hay out of Barry’s erroneous prognostications early in the unfolding Fukushima event. But there are two things they don’t ever, ever do: Point out where Barry, on his own site, revisits this mistake, corrects the record and engages in some searching self-criticism Follow Barry’s example in the now innumerable examples of incorrect, foolish and downright dangerous misinformation that has been spread about nuclear power, such as those highlighted above For example, in response to my own recent piece on activists deliberately stoking outrage, Green put the hard word on the Brisbane branch of FoE who were continuing to highlight a (medically impossible) link between Fukushima and a “spike in deaths” in the USA in the immediate aftermath of the accident. Apparently even Green has his limits. But will you find a retraction from FoE? No. A correction? Certainly not. Some self-criticism as to how such absolute claptrap could have been posted under their good name? No way. Acknowledgement that is was only through sheer embarrassment caused by an independent blogger that they finally removed it in the first place? You get the picture. I have not enjoyed writing this, nor indeed needing to write it in the first place. I don’t like seeing a cheap hatchet job on one of our best and brightest scientists, not just because he is a friend of mine, but because he is an outstanding Australian and a caring leader in our global community. I don’t like knowing someone has bastardised references, only to find it is way, way worse than I would even have expected. I don’t like watching environmental organisations, some of which I supported with both my money and my time when I was younger, sink this low and keep sinking, seemingly proud of their efforts. I really don’t like that it seems impossible to give a firm rebuttal without taking an individual to task, and I hate that someone undecided on nuclear power may read this and think that I just hate FoE. But bullshit like this has got to stop, and it stops when people start taking a stand. The schism in environmentalism over nuclear power is now well underway. It is sad that the other side seem to have decided in their righteousness that they are allowed to play dirty and go after individuals, using the same cherry-picking abuse of science that is all too familiar in climate change denial. Based on the way so many issues play out, I think it would be a real tactical mistake to presume that this sort of cheap, tabloid activism does not work, and to think we can fight this without getting into the mud. If you indentify as someone who cares about the environment, you DO have a choice to make in the next few years: you are either pro-nuclear or anti-nuclear. There are two camps. Please, look carefully. Think critically. Choose wisely.

#### Exceptionalism spurs rationalization for destabilization – sustaining non-proliferation is necessary through a consequentialist framing.

Christopher Ford, January 2011, is a Senior Fellow at the Hudson Institute in Washington, D.C., previously served as U.S. Special Representative for Nuclear Nonproliferation, Principal Deputy Assistant Secretary of State, and General Counsel to the U.S. Senate Select Committee on Intelligence, Oxford University (as a Rhodes Scholar), and Yale Law, “Haves and Have-Nots: “Unfairness” in Nuclear Weapons Possession,” <http://www.newparadigmsforum.com/NPFtestsite/?p=658>

Let me be clear about this. The moral critique of nuclear weapons possession may yet speak to the issue of whether anyone should have them. (This is not the place for a discussion of the feasibility of the remedies proposed by the disarmament community, but let us at least acknowledge the existence of a real moral issue.) But this matter has nothing to do with “unfairness” per se – and to the extent that it purports to, one should give it little credence. If indeed nuclear weapons do menace the survival of humanity, it is essentially irrelevant whether their possession is “unfairly” distributed – and it is certainly no solution to make the global balance of weaponry more “fair” by allowing more countries to have them. (Disarmament advocates hope to address the fairness problem by eliminating nuclear weapons, of course, but this is just icing. Disarmament is almost never articulated as being driven primarily by fairness; the critical part of that argument is instead consequentialist, stressing the dangers that any nuclear weapons are said to present.) As a moral critique, in other words, the fair/unfair dichotomy fails to speak intelligibly to the world’s nuclear dilemma. It isn’t really about “fairness” at all. Given the entanglement of nuclear weapons issues with quasi-existential questions potentially affecting the survival of millions or perhaps even billions of people, moreover, it stands to reason that an “unfair” outcome that nonetheless staves off such horrors is a perfectly good solution. On this scale, one might say, non-catastrophe entirely trumps accusations of “unfairness.” Questions of stability are far more important than issues of asymmetric distribution. This, of course, has powerful implications for nonproliferation policy, because pointing out the hollowness of the “unfairness” argument as applied to nuclear weapons suggests the moral sustainability of nonproliferation even if complete nuclear disarmament cannot be achieved and the world continues to be characterized by inequalities in weapons possession. We forget this at our collective peril. Don’t get me wrong. “Unfairness” arguments will presumably continue to have a political impact upon the diplomacy of nuclear nonproliferation, either as a consequence of genuine resentment or as a cynical rationalization for the destabilizing pursuit of dangerous capabilities. (Indeed, one might even go so far as to suspect that the emergence of the “unfairness” critique in modern diplomatic discourse is in some sense partly the result of how morally compelling nonproliferation is, in this context, irrespective of the “fairness” of “have/have not” outcomes. Precisely because the moral case for nonproliferation-driven inequality is so obvious and so compelling if such imbalance serves the interests of strategic stability, perhaps it was necessary to develop a new rationale of “fairness” to help make proliferation aspirations seem more legitimate. Skraelings, one imagines, did not need an elaborate philosophy of “fairness” in order to justify trying to steal iron weapons; the desirability of such tools was simply obvious, and any effort to obtain them unsurprising and not in itself condemnable.) But even in this democratic and egalitarian age, merely to incant the mantra of “unfairness” – or to inveigh against the existence of “haves” when there also exist “have nots” – is not the same thing as having a compelling moral argument. Indeed, I would submit that we lose our moral bearings if we allow “unfairness” arguments to distract us from what is really important here: substantive outcomes in the global security environment. “Unfairness,” in other words, is an overrated critique, and “fairness” is an overrated destination. At least where nuclear weapons are concerned, there are more important considerations in play. Let us not forget this.

#### There is no connection between haves discourse and actual violence – their arguments mistake causation and correlation.

Andrew J. Rotter, 2000, prof at colgate, "Saidism without said: orientalism and US diplomatic history," The american historical review, p. 1208-10

A third and yet more troubling problem for historians reading Orientalism is Said's dubious epistemological relationship to matters of cause and effect. Discourse theory and postmodernism generally have shaken old certainties about history as a kind of science, a divining rod, which, properly wielded, will indicate the truth. In the postmodern universe, there is no truth, just self-serving "realities" promoted by regimes of power. "Reality is the creature of language," and "Western Man a modern-day Gulliver, tied down with ideological ropes and incapable of transcendence because he can never get beyond the veil of language to the reality 'out there,'" as three historians have summarized it. Following Nietzsche and Heidegger, postmodernists like Michel Foucault deny the linearity of the historical process; thus "causation should be pitched out." For better or worse, most historians still believe that they are engaged in a search for reasons why things happened as they did. An event occurs, like the American Revolution. It is not, they say, a construct or a representation but a revolution, properly named. There are reasons why the revolution occurred, and even though historians might assign different weights to these reasons or argue over whether some of them mattered at all, they still believe that the causes of the revolution are knowable, that they preceded the act of revolution itself, and that they are important to understand.6 7 One of the contributions of discourse theory has been to complicate—a virtue, in its own terms—comfortable assumptions about historical causation. But do the difficulties of ascribing cause make the effort itself a fool's errand? Said seems unsure. At times, James Clifford has pointed out, Said "suggests that 'authenticity,' 'experience,' 'reality,' 'presence,' are mere rhetorical contrivances." Elsewhere in Orientalism, he posits "an old-fashioned existential realism." Sometimes, Orientalism "distorts, dominates, or ignores some real or authentic feature of the Orient"; sometimes, Said "denies the existence of any 'real' Orient." There is, he asserts, a relationship between the discourse of Orientalism and the exercise of power by the West over the Mideast. The discourse, Said wrote, "is by no means in direct, corresponding relationship with political power in the raw, but rather is produced and exists in uneven exchange with various kinds of power," including political, intellectual, cultural, and moral. Making allowances for lifting this quotation out of a longer passage, it is nevertheless reasonable to wonder about the agency of that word "produced." Does Said mean to say, as his grammar suggests, that the discourse is "produced . . . with various kinds of power" rather than by power, or that the discourse has an independent source? Is discourse a dependent variable where power is concerned, providing a reservoir of culturally shaped images from which the powerful can draw to justify decisions made for reasons of perceived strategic or economic interest?7 8 Said's efforts to illuminate these connections are not always successful. Responding to Bernard Lewis's attack on Orientalism, Said insisted that "there is a remarkable (but nonetheless intelligible) coincidence between the rise of modern Orientalist scholarship and the acquisition of vast Eastern empires by Britain and France." "Coincidence" is far from cause and effect. In Culture and Imperialism, where the relationship between discourse and power is the heart of the matter, Said admitted: "It is difficult to connect these different realms, to show the involvements of culture with expanding empires, to make observations about art that preserve its unique endowments and at the same time map its affiliations." Said's subsequent use of language indicates the difficulty. His definition of imperialism includes not just the "practice" and "theory" of domination but also the "attitudes of a dominating metropolitan center ruling a distant territory"—a statement that calls to mind Mark Lilla's comment that "postmodernism is long on attitude and short on argument." Said struggles to decide whether culture and politics are separate spheres in some ways connected or finally the same thing. Novels never "'caused'" imperialism, but reading Conrad's Heart of Darkness "was part of the European effort to hold on to, think about, plan for Africa"; and, while no one would construe Moby Dick as "a mere literary decoration of events in the real world . . . the fact is that during the nineteenth century the United States did expand territorially, most often at the expense of native peoples, and in time came to gain hegemony over the North American continent and the territories and seas adjacent to it." That is a fact; what it has to do with Moby Dick is less clear.8 9

#### Specificity comes first or you risk atrocity.

Colin S. Gray, 2003, Review of International Studies, 29, 285–295 Copyright © British International Studies Association

I interpret Payne’s argument to mean that a combination of American cultural arrogance and laziness has encouraged the view that one size and style of supposedly realist analysis must fit all. Payne’s logic does not differ notably from the ideas on ethnocentrism developed more than twenty years ago by Ken Booth in this country.15 Although I am in complete sympathy with Poore’s commentary, I cannot help but notice that even he sails perilously close to the wind of inadvertent selfcontradiction when he writes, for example: ‘For ambitious strategic culture protagonists strategic culture provides a direct challenge to the hegemony of realist theorising’. It is unsound to suggest, as does Poore here, that realist theorising can be innocent of culturalist input. He commits the same systemic error as does Desch, with his head-to-head assessment of cultural versus realist explanations of behaviour. The general Western, certainly the general American, strategic wisdom of today is powerfully anti-nuclear. This stance has everything to do with the US strategic context at present. It should be needless to add that that US context is not widely shared beyond the circle of polities who are directly the beneficiaries of the international order that the United States guards. It follows that US-authored general theory on the evils of nuclear armament is likely to be irrelevant o8r even misleading for actors beyond the pale of the American order. Most of the objects of concern will be polities or groups with strategic cultures not shaped by contemporary high confidence in their conventional, or unconventional asymmetrical, but non-nuclear, prowess. Stuart Poore is exactly right when he concludes that ‘[s]trategic culturalists should now be urged to generate more empirical research into particular strategic cultural cases through the use of thick description. In doing so, many new insights can be gained into cases where previously rationalist materialist explanations have exerted an over-bearing dominance’. That sounds remarkably like Ken Booth arguing a generation ago for better regional studies. Booth was correct then, as is Poore today. Those scholars may, or may not, be happy to know that the Pentagon now agrees with them, hence the creation of the new Deterrence Analysis Center to which I have referred. Strategic cultural analysis is vital because it alone – save only for old-fashioned espionage, of course – can make sense of those material factors which realist beliefs are utterly unable to decode. To illustrate, what would a general, acultural, theory of strategy have told us about German rearmament in the 1930s? Did that military recovery have some immanent meaning, totally unambiguous to the well-schooled realist? Of course it did not. If the first question to pose was ‘what is Germany acquiring?’, the second was ‘what does Germany intend to do with it?’ That all important second question could not be answered according to some presumed-tobe general truth about military balance and imbalance. The behaviour of statesmen is influenced, or more, by their beliefs. Cultural analysis is methodologically near impossible if, following Johnston’s mighty efforts, one seeks falsifiable theory. The reason is because culture is literally everywhere: it is too pervasive, yet elusive, for its influence to be isolated for rigorous assessment. Although I distinguish culture as an identifiable dimension of strategy, also I claim that ‘all dimensions of strategy are cultural’.16 That is why I welcome Poore’s advice to treat with authority ‘context all the way down’. I do not think that I was confused as between what was cultural and what was not, because it has long been clear to me that everything with strategic significance is chosen, employed, or interpreted, according to some particular ideational set that we can call cultural. Somewhat belatedly, faint but pursuing, I have come to appreciate that cultural analysis of strategic matters is as valid and essential as it is likely to thwart the scholarly architect of general theory. Poore is right. We need empirically thick studies of societies of interest, always remembering that we must filter what we learn through the distorting lens of our own culture. The way forward is well signposted: more empirical investigation of actual beliefs and attitudes (as contrasted with merely presumed beliefs and attitudes); no more drawing of false distinctions between realist and culturalist explanations; and a moratorium on noble endeavours to build falsifiable general theory. Some political leaders, with the more or less enthusiastic support of their societies, will deploy their army for defence, some for offence, and others will try to employ it to slaughter their neighbours, foreign and even domestic. Thus do the two commentaries that I have addressed coalesce. There is no abstract, rational, realist strategic logic which determines completely what an army should be about. Whether or not an army is unleashed to commit mass murder, depends very largely upon the beliefs of its chieftains. To that extent at least, Martin Shaw and I are in total accord. Whereas Poore’s essay usefully and justly urges me to be more consistent in my treatment of culture in context, my differences with Shaw extend to the very identity of the contexts that shape and give meaning to behaviour. In my world view, we face strategic problems that require strategic, certainly grand strategic rather than narrowly military strategic, answers. In other words, I believe that strategy is hero, not villain. When I said, perhaps unkindly, that I find Shaw empirically challenged, what I had in mind was that every one of the atrocity events of recent history that he and I both deplore, either was, or could have been, prevented or halted only by strategic behaviour. Whether warfare remains, as at present, mainly an intra- and trans- state event, or whether it migrates back to the stratospheric unpleasantness of great-power struggle, it must occur in a context wherein the logic of strategy rules. The sadly imperfect answer to our troubles of insecurity lies in the practice of effective strategy by a guardian power, with some assistance from others. Whether or not he so intended, Carl von Clausewitz wrote about war for all time, not just for a period that now may be dismissed as the era of ‘old wars’.17 If we will the ends we have to will the means, and we must be prepared to make choices we would prefer to evade. An international order consistent with our definition of the good enough life, has to be protected by someone. If the genocides and slaughters that we all abhor are not to become routine, then we have to choose to unleash primarily American military power, the only global source of strategic effectiveness reliably able to do the job. Given his concerns, Shaw should be writing in praise of American strategy.

#### Existence is a prerequisite to questioning.

Paul Wapner, Winter 2003, assoc. prof. and dir. of the Global Environmental Policy Program @ American Univ., “Leftist criticism of,” <http://www.dissentmagazine.org/article/?article=539>

THE THIRD response to eco-criticism would require critics to acknowledge the ways in which they themselves silence nature and then to respect the sheer otherness of the nonhuman world. Postmodernism prides itself on criticizing the urge toward mastery that characterizes modernity. But isn't mastery exactly what postmodernism is exerting as it captures the nonhuman world within its own conceptual domain? Doesn't postmodern cultural criticism deepen the modernist urge toward mastery by eliminating the ontological weight of the nonhuman world? What else could it mean to assert that there is no such thing as nature? I have already suggested the postmodernist response: yes, recognizing the social construction of "nature" does deny the self-expression of the nonhuman world, but how would we know what such self-expression means? Indeed, nature doesn't speak; rather, some person always speaks on nature's behalf, and whatever that person says is, as we all know, a social construction. All attempts to listen to nature are social constructions-except one. Even the most radical postmodernist must acknowledge the distinction between physical existence and non-existence. As I have said, postmodernists accept that there is a physical substratum to the phenomenal world even if they argue about the different meanings we ascribe to it. This acknowledgment of physical existence is crucial. We can't ascribe meaning to that which doesn't appear. What doesn't exist can manifest no character. Put differently, yes, the postmodernist should rightly worry about interpreting nature's expressions. And all of us should be wary of those who claim to speak on nature's behalf (including environmentalists who do that). But we need not doubt the simple idea that a prerequisite of expression is existence. This in turn suggests that preserving the nonhuman world-in all its diverse embodiments-must be seen by eco-critics as a fundamental good. Eco-critics must be supporters, in some fashion, of environmental preservation.

#### Even if no absolute truth - we can create provisional consensus and common understanding.

Yale Ferguson & Richard Mansbach, 2002, Professor of International Relations at Rutgers, and Richard Mansbach, Professor of International Relations at Iowa State, International Relations and the “Third Debate,” ed. Jarvis

Although there may be no such thing as “absolute truth” (Hollis, 1994:240-247; Fernandez-Armesto, 1997:chap.6), there is often a sufficient amount of intersubjective consensus to make for a useful conversation. That conversation may not lead to proofs that satisfy the philosophical nit-pickers, but it can be educational and illuminating. We gain a degree of apparently useful “understanding” about the things we need (or prefer) to “know.”

## 1AR

### solvency

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

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

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

#### Investors want exposure to nuclear – assumes natural gas.

SmartMoney, 3-16-2012, “Should Investors Go Nuclear?,” <http://blogs.smartmoney.com/advice/2012/03/16/should-investors-go-nuclear/>

The combination of low natural gas prices and the fallout from recent accidents turned many utilities off from building new nuclear power plants. But analysts say investors may still want more exposure to nuclear energy. Despite the lack of new nuclear facilities, existing plants continue to produce cheap, clean power. Right now, low natural gas prices are diminishing profit margins for many utilities, says Travis Miller, the director of utilities research at Morningstar. But nuclear power is still far cheaper to produce — and gas prices are only likely to go up, he says. “We think gas prices have to rise from here to rationalize the market.” And as soon as those prices rise, nuclear power producers can boost prices, and profit margins. The utility best-positioned to benefit from that trend would be Exelon (EXC ), the largest operator of nuclear power plants in the U.S., Miller says. “As the cost for other sources of power, specifically coal and natural gas, rise, Exelon’s earnings should rise,” he says. Plus, Exelon’s nuclear plants aren’t affected by new environmental regulations that may force some coal plants to close, he says. Morningstar analysts also see NRG Energy (NRG ) as a good value now. Two-thirds of this company’s power generation comes from coal and nuclear plants. Its coal plants are already more efficient than competitors’, Miller says. “We think its entire fleet, including nuclear and its very low-cost and efficient coal and gas plants, all can benefit in an environment where power demand and gas prices rise,” he says.