### Limits Good

**Their counter-interpretation explodes limits: [EXPLAIN]**

**Predictable Limits are good:**

**a.) They kill Preparation – the infinite number of affirmatives under their interpretation decimates the ability for the neg to properly research each aff case – there are multiple impacts**

**First this kills fairness – infinite prep means the aff will always be ahead in research – kills fairness**

**Second, kills the depth of education – broad topic kills specific depth of research, bredth is inevitable through reading the newspaper – only depth allows us to apply knowledge outside the debate**

**“Depth is a better way to prepare students for success”**

**SD, 09 -** (Science Daily, “Students Benefit From Depth, Rather Than Breadth, In High School Science Courses”, http://www.sciencedaily.com/releases/2009/03/090305131814.htm)

Green highlighting = read in tag

A recent study reports that high school students who study fewer science topics, but study them in greater depth, have an advantage in college science classes over their peers who study more topics and spend less time on each. Robert Tai, associate professor at the University of Virginia's Curry School of Education, worked with Marc S. Schwartz of the University of Texas at Arlington and Philip M. Sadler and Gerhard Sonnert of the Harvard-Smithsonian Center for Astrophysics to conduct the study and produce the report. The study relates the amount of content covered on a particular topic in high school classes with students' performance in college-level science classes. "As a former high school teacher, I always worried about whether it was better to teach less in greater depth or more with no real depth. This study offers evidence that teaching fewer topics in greaterdepth is a better way to prepare students for success in college science," Tai said. "These results are based on the performance of thousands of college science students from across the United States." The 8,310 students in the study were enrolled in introductory biology, chemistry or physics in randomly selected four-year colleges and universities. Those who spent one month or more studying one major topic in-depth in high school earned higher grades in college science than their peers who studied more topics in the same period of time. The study revealed that students in courses that focused on mastering a particular topic were impacted twice as much as those in courses that touched on every major topic. The study explored differences between science disciplines, teacher decisions about classroom activities, and out-of-class projects and homework. The researchers carefully controlled for differences in student backgrounds. The study also points out that standardized testing, which seeks to measure overall knowledge in an entire discipline, may not capture a student's high level of mastery in a few key science topics. Teachers who "teach to the test" may not be optimizing their students' chance of success in college science courses, Tai noted. "President Obama has challenged the nation to become the most educated in the world by having the largest proportion of college graduates among its citizens in the coming decade," Tai said. "To meet this challenge, it is imperative that we use the research to inform our educational practice." The study was part of the Factors Influencing College Science Success study, funded by the National Science Foundation.

**This turns their education claims because in the world of the affirmative interpretation we always rely on stale generics like Consult and the Security K which makes the aff irrelevant**

**b.) Debate – Limits kill the activity**

**Rowland 84 -** (Robert C., Baylor U., “Topic Selection in Debate”, American Forensics in Perspective. Ed. Parson, p. 53-4)

The first major problem identified by the work group as relating to topic selection is the decline in participation in the National Debate Tournament (NDT) policy debate. As Boman notes: There is a growing dissatisfaction with academic debate that utilizes a policy proposition. Programs which are oriented toward debating the national policy debate proposition, so-called “NDT” programs, are diminishing in scope and size.4 This decline in policy debate is tied, many in the work group believe, to excessively broad topics. The most obvious characteristic of some recent policy debate topics is extreme breath. A resolution calling for regulation of land use literally and figuratively covers a lot of ground. Naitonal debate topics have not always been so broad. Before the late 1960s the topic often specified a particular policy change.5 The move from narrow to broad topics has had, according to some, the effect of limiting the number of students who participate in policy debate. First, the breadth of the topics has all but destroyed novice debate. Paul Gaske argues that because the stock issues of policy debate are clearly defined, it is superior to value debate as a means of introducing students to the debate process.6 Despite this advantage of policy debate, Gaske belives that NDT debate is not the best vehicle for teaching beginners. The problem is that broad policy topics terrify novice debaters, especially those who lack high school debate experience. They are unable to cope with the breadth of the topic and experience “negophobia,”7 the fear of debating negative. As a consequence, the educational advantages associated with teaching novices through policy debate are lost: “Yet all of these benefits fly out the window as rookies in their formative stage quickly experience humiliation at being caugh without evidence or substantive awareness of the issues that confront them at a tournament.”8 The ultimate result is that fewer novices participate in NDT, thus lessening the educational value of the activity and limiting the number of debaters or eventually participate in more advanced divisions of policy debate. In addition to noting the effect on novices, participants argued that broad topics also discourage experienced debaters from continued participation in policy debate. Here, the claim is that it takes so much times and effort to be competitive on a broad topic that students who are concerned with doing more than just debate are forced out of the activity.9 Gaske notes, that “broad topics discourage participation because of insufficient time to do requisite research.”10 The final effect may be that entire programs either cease functioning or shift to value debate as a way to avoid unreasonable research burdens. Boman supports this point: “It is this expanding necessity of evidence, and thereby research, which has created a competitive imbalance between institutions that participate in academic debate.”11 In this view, it is the competitive imbalance resulting from the use of broad topics that has led some small schools to cancel their programs.

#### Restrictions’ must be direct and immediate limitations on freedom – otherwise it is simply a regulation

CJ Veeraswami (Former Chief Justice of the Madras High Court, India) 1966 “T.M. Kannappa Mudaliar And Ors. vs The State Of Madras” Majority opinion,

http://www.indiankanoon.org/doc/838831/

The collection of a toll or a tax for the use of a road or for the use of a bridge or for the use of an aerodrome is no barrier or burden or deterrent to traders, who, in their absence, may have to take a longer or less convenient or more expensive route. Such compensatory taxes are no hindrance to anybody's freedom so long as they remain reasonable; but they could of course, be converted into a hindrance to the freedom of trade. If the authorities concerned really wanted to hamper anybody's trade they could easily raise the amount of tax or toll to an amount which would be prohibitive or deterrent or create other impediments which instead of facilitating trade and commerce would hamper them. It is here that the contrast, between 'freedom' (Article 301) and 'restrictions' (Articles 302 and 304) clearly appears; that which in reality facilitates trade and commerce is not a restriction, and that which in reality hampers or burdens trade and commerce is a restriction. It is the reality or substance of the matter that has to be determined. It is not possible apriori to draw a dividing line between that which would really be a charge for a facility provided and that which would really be a deterrent to a trade, but **the distinction**, if it has to be drawn **is real and clear**. For the tax to become a prohibited tax it has to be a direct tax the effect of which is to hinder the movement part of trade. So long as a tax remains compensatory or regulatory it cannot operate as a hindrance. 12. Subba Rao, J. as he then was, concurring with Das, J. took substantially the same view and observed (at page 1430);: The word ' freedom ' is not capable of precise definition, but it can be stated what would infringe or detract from the said freedom. Before a particular law can be said to infringe the said freedom, it must be ascertained whether the impugned provision operates as a restriction impeding the free movement of trade **or only** as **a regulation** facilitating the same. Restrictions obstruct the freedom, whereas regulations promote it. Police regulations, though they may superficially appear to restrict the freedom of movement, in fact provide the necessary conditions for the free movement. Regulations such as provision for lighting, speed, good condition of vehicles, timings, rule of the road and similar others, really facilitate the freedom of movement rather than retard it. So too, licensing system with compensatory fees would not be restrictions but regulatory provisions;, for without it, the necessary lines of communication such as roads, waterways and airways, cannot effectively be maintained and the freedom declared may in practice turn out to be an empty one....It is for the Court in a given case to decide whether a provision purporting to regulate trade is in fact a restriction on freedom. The further observations as to what was meant by Restrictions in Article 302 are (at page 1433): But **the more difficult question is, what does** the word **" restrictions " mean** in Article 302? The dictionary meaning of the word " restrict" is "to confine, bound, limit." Therefore any limitations placed upon the freedom is a restriction on that freedom. But the **limitation** must be real, direct and immediate, but not fanciful, indirect or remote....Of all the doctrines evolved in my view, the doctrine of ' direct and immediate effect' on the freedom would be a reasonable solvent to the difficult situation that might arise under our Constitution. If a law, whatever may have been its source, directly and immediately affects the free movement of trade, it would be restriction on the said freedom. But a law which may have only indirect and remote repercussions on the said freedom cannot be considered to be a restriction on it. 13. Subba Rao, J., as he then was summed up his views in the following words (at page 1436): The foregoing discussions may be summarised in the following propositions : (1) Article 301 declares a right of free movement of trade without any obstructions by way of barriers, inter-State or intra-State or other impediments operating as such barriers. (2) The said freedom is not impeded, but on the other hand, promoted by regulations creating conditions for the free movement of trade, such as, police regulations, provision for services, maintenance of roads, provision for aerodromes, wharfs, etc. with or without compensation. (3) Parliament may by law impose restrictions on such freedom in the public interest and the said law can be made by virtue of any entry with respect whereof Parliament has power to make a law. (4) The State also, in exercise of its legislative power, may impose similar restrictions, subject to the two conditions laid down in Article 304 (b) and subject to the Proviso mentioned therein. (5) Neither Parliament nor the State Legislature can make a law giving preference to one State over another or making discrimination between one State and another, by virtue of any entry in the Lists, infringing the said freedom. (6) This ban is lifted in the case of Parliament for the purpose of dealing with situations arising out of scarcity of goods in any part of the territory of India and also in the case of a State under Article 304 (h), subject to the conditions mentioned therein. And (7) the State can impose a non-discriminatory tax on goods imported from other States or the Union territory to which similar goods manufactured or produced in the State are subject. 14. It is thus well established that regulatory provisions which do not directly or immediately impede or burden the free movement of trade, commerce and intercourse but provide or intend to provide facilities for trade, commerce and intercourse are not restrictions within the meaning of Part XIII and are compatible with the freedom of trade declared by Article 301. Atiabari Tea Co., Ltd. v. State of Assam , and Automobile Transport Ltd. v. State of Rajasthan , are both cases of imposition of tax. The first was concerned with the Assam Taxation (on Goods carried by Roads or Inland Waterways) Act, 1954,, which was successfully attacked on the ground that it violated Article 301 and was not saved by Article 304 (b). The Act imposed a tax on specified goods transported by road or inland waterways in the State of Assam. The majority in that case held that the Act put a direct restriction on the freedom of trade and, since in doing so, had not complied with the provisions of Article 304 (b), it must be declared to be void. In the second case the Rajasthan Motor Vehicles Taxation Act, 1951, was impugned as violating Article 301. But the majority did not accept the contention on the view that the Act was merely a regulatory measure imposing compensatory taxes for the use of trading facilities. The scope of Article 301 was again in the light of the earlier decisions referred to in Khyerbari Tea Co. v. State of Assam , where the Assam Taxation (On goods carried by Roads or Inland Waterways) Act as amended after Atiabari Tea Co. Ltd. v. State of Assam , was attacked on various grounds but without success. 15. As already seen, **the distinction** between a restriction and a regulation **is fine but real**, though the dividing line is not capable in the nature of things of a comprehensive and satisfactory definition. The test, broadly speaking, is whether the impugned provisions lay a direct and immediate burden on the movement of trade, commerce and intercourse or are intrinsically beneficial to and provide, in the ultimate analysis, facilities for better conduct of trade, commerce and intercourse. Observed Das, J., in Automobile Transport Ltd. v. State of Rajasthan

#### ‘For’ requires a direct relationship, it can’t be something that just affects the object

Words and Phrases, 4 (Words and Phrases Permanent Edition, “For,” Volume 17, p. 338-343 November 2004, Thomson West)

WD Tenn 1942. The Fair Labor Standards Act of 1938 uses the words “production for commerce” as denoting an intention to deal in a restricted way with question of coverage in connection with those employed directly in production of articles to be sold, shipped or transported across state lines in commerce, producing goods “for” a certain purpose implying a direct relation as distinguished from producing something which only “affects” a certain purpose which implies an indirect relation.

Enters et al, 4 – Food and Agricultural Organization (Thomas, “What does it take? The role of incentives in forest plantation development in Asia and the Pacific”, http://www.fao.org/docrep/007/ad524e/ad524e05.htm)

The distinction between direct and indirect incentives is somewhat blurred. Direct incentives are designed to have an immediate impact on resource users and influence returns to investment directly. Indirect incentives on the other hand have an indirect effect through setting or changing the overall framework conditions within and outside the forestry sector. There are some overlaps. For example, tax concessions for plantation investors are a direct incentive, whereas general tax reductions for fuel are considered indirect incentives, because they lower production and transport costs within - as well as outside - the plantation sector.

### 2NC Links to Limits

Justifies

* Threaten to tax gas
* Elect Romney and argue that would help fossil fuel investor confidence

#### Broadly defining incentives explodes the topic – well over 40 different mechanisms

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

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

#### Indirect incentives that effect price are limitless – targeted financial incentives are the only predictable way of preparing for the topic

Dyson et al, 3 - International Union for Conservation of Nature and Natural Resources (Megan, Flow: The Essentials of Environmental Flows, p. 67-68)

Understanding of the term ‘incentives’ varies and economists have produced numerous typologies. A brief characterization of incentives is therefore warranted. First, the term is understood by economists as incorporating both positive and negative aspects, for example a tax that leads a consumer to give up an activity that is an incentive, not a disincentive or negative incentive. Second, although incentives are also construed purely in economic terms, incentives refer to more than just financial rewards and penalties. They are the “positive and negative changes in outcomes that individuals perceive as likely to result from particular actions taken within a set of rules in a particular physical and social context.”80 Third, it is possible to distinguish between direct and indirect incentives, with direct incentives referring to financial or other inducements and indirect incentives referring to both variable and enabling incentives.81 Finally, incentives of any kind may be called ‘perverse’ where they work against their purported aims or have significant adverse side effects.

Direct incentives lead people, groups and organisations to take particular action or inaction. In the case of environmental flows these are the same as the net gains and losses that different stakeholders experience. The key challenge is to ensure that the incentives are consistent with the achievement of environmental flows. This implies the need to compensate those that incur additional costs by providing them with the appropriate payment or other compensation. Thus, farmers asked to give up irrigation water to which they have an established property or use right are likely to require a payment for ceding this right. The question, of course, is how to obtain the financing necessary to cover the costs of developing such transactions and the transaction itself.

Variable incentives are policy instruments that affect the relative costs and benefits of different economic activities. As such, they can be manipulated to affect the behaviour of the producer or consumer. For example, a government subsidy on farm inputs will increase the relative profitability of agricultural products, hence probably increasing the demand for irrigation water. Variable incentives therefore have the ability to greatly increase or reduce the demand for out-of-stream, as well as in-stream, uses of water. The number of these incentives within the realm of economic and fiscal policy is practically limitless.

### 2NC – 2 CP’s

**Counter interp – we get what we did**

**That’s best**

**Counter interp – we get 1 advocacy and cant cross apply offense – solves their impact**

**That’s best**

**First, Neg Flex – in round flexibility is key – their interpretation allows the aff to straight jacket the negative into a position and decimates our ability to adapt – only the aff has infinite prep time and the ability to fully research their case – we cant predict new advantages, affs, add ons or clarifications, their interp encourages the aff to be vague and read their best arguments in 2ac – only neg flex allows us to respond**

**Second, Research – condo incentivizes the neg to research multiple positions – their interp destroys that incentive – also multiple options means the aff is forced to research more to find answers – key to education**

**Third, Logic – doing nothing should always be an option for policy makers, key to real world decision making and overall rational decision making**

**Fourth, Reasonability – we shouldn’t lose for what we possibly justify, there is always a better form of debate, competing interpretations justifies a race to the bottom, what we did in this debate doesn’t justify a loss**

**Fifth, Perms check – their like advocacies**

### Exts – Cant Solve

**Even if they’re right about everything, nuclear power can’t be deployed in time to stop warming- one accident eliminates solvency**

**N02NP.org 7 \***N02 Nuclear Power.org is a site created and run by Pete Roche who is an energy consultant based in Edinburgh and policy adviser to the Scottish Nuclear Free Local Authorities, and the National Steering Committee of [UK NFLA](http://nfznsc.gn.apc.org/). Pete was co-founder of the Scottish Campaign to Resist the Atomic Menace (SCRAM), he has represented Greenpeace at international meetings and is active in several other areas relating to environmental protection and nuclear power [http://www.no2nuclearpower.org.uk/reports/Opportunity\_Costs\_Nuclear.pdf, January 2007 “Opportunity Costs of Nuclear Power]

Timing To tackle climate change the speed with which carbon abatement measures can be introduced is also important. The construction of nuclear power stations will have a long lead-time. During the period when reactors are being constructed, capital is tied up and therefore unavailable for investing in alternative carbon abatement techniques. Because nuclear investments are also inherently slower to deploy, then such investments also retard carbon displacement. Delivering a kilowatt-hour from a new nuclear power station costs at least three times as much as saving one through efficiency measures. Thus every dollar spent on efficiency would displace three times more coal than a dollar spent on new reactors. But, perhaps more importantly, the savings from spending on efficiency can go into effect much more quickly, because it takes so long to build reactors. (2) The UK Association for the Conservation of Energy, for example, says that the most optimistic assumption is that one new nuclear power plant could be operating in the UK by 2020, delivering perhaps just over one million tonnes of carbon saving. In contrast energy efficiency "could save around 25 million tonnes of carbon through cost-effective energy efficiency measures" by that date. (3) In 2004, decentralised low- and no-carbon generation added 28GW of capacity worldwide – six times more than nuclear power, with three times more extra output. (4) This was achieved despite nuclear power’s generally higher subsidies per kWh and its far easier access to the grid. Decentralised energy can be installed quickly without needing complex regulatory processes. Despite moves around the globe to speed up regulatory approval of new reactors it is hard to imagine how this balance of speed could ever shift in favor of nuclear power. New reactors take a long time to build are delay-prone, complex, and contentious technology, and one a single major accident or terrorist attack could scuttle nuclear stations virtually everywhere.

**It is physically impossible to put up enough reactors to even stop co2 from rising**

**Smith and Makhijani 6** \*Brice Smith is an assistant professor of physics at the State University of New York, Cortland, and the author of Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Change (2006). Arjun Makhijani is president of the Institute for Energy and Environmental Research in Takoma Park, Maryland, and the principal author of Nuclear Power Deception: U.S. Nuclear Mythology From Electricity “Too Cheap to Meter” to ‘‘Inherently Safe” Reactors (1999) [http://www2.econ.iastate.edu/faculty/bhattacharya/102H/nuclear1.pdf, “Nuclear is not the Way” 2006]

The most important consideration is how many nuclear plants would be needed to significantly reduce future CO2 emissions. A 2003 study by researchers at the Massachusetts Institute of Technology, The Future of Nuclear Power, considered a reference case in which 1,000 one-gigawatt (GW) nuclear plants would be in operation around the world by 2050. (A gigawatt is enough electricity to power a U.S. city of half a million.) Even with such an increase, however, the proportion of electricity supplied by nuclear power worldwide would rise only slightly, from about 16 percent in 2000 to about 20 percent in 2050. As a result, the number of fossil fuel power plants, and thus the amount of CO2 emissions, would continue to increase. A more serious effort to limit carbon emissions through the use of nuclear power would require a larger number of reactors. In Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Climate Change (2006), one of us used the same projected growth in electricity demand employed in the MIT report to estimate the number of reactors required simply to maintain the electricity sector’s CO2 emissions at their 2000 levels. **Some 2,500 one-GW nuclear plants would be needed by midcentury. To meet that goal, one plant would have to come online somewhere in the world every six days between 2010 and 2050.**

**Nuclear cant solve-too slow, doesn’t reduce full system emissions**

**Slater 8** \*Alice Slater is the New York Director, of the Nuclear Age Peace Foundation and Convenor ofAbolition 2000, Working Group for Sustainable Energy [https://www.wagingpeace.org/articles/2008/08/18\_slater\_towards\_irena.pdf, Towards an international renewable energy agency Nuclear power no solution to global warming, Pacific Ecologist Winter 2008]

Despite the obvious health and security disadvantages of utilizing nuclear power to produce electric- ity, it’s being promoted in some quarters as having potential to help avert future climate catastrophes. But nuclear power is not pollution or emissions free. Every step of the nuclear fuel cycle: mining, development, production, transportation and disposal of waste, relies on fossil fuels and produces greenhouse gas emissions. A complete life-cycle analysis shows, generating electricity from nuclear power emits 20–40% of the carbon dioxide per kilowatt hour of a gas-fired system when the whole system is taken into account.3 Equally important, nuclear power is the slowest and costliest way to reduce CO2 emissions, as financing nuclear power diverts scarce resources from investments in renewable energy and energy efficiency. The enormous costs of nuclear power per unit of reduced carbon emissions would actually worsen our ability to abate climate change as we would buy less carbon-free energy per dollar spent on nuclear power compared to emissions we would save by investing those dollars in solar, wind or energy efficiency. According to a Massachusetts Institute of Technology study on the future of nuclear power, 1,500 new nuclear reactors would have to be constructed worldwide by mid-century for nuclear power to have a modest impact on the reduction of greenhouse gasses.4 Nuclear power’s role in mitigating climate change is further constrained because its impact is limited to producing only electricity.

### 2NC Cant Solve

**Muller says**

warming could take place in less than 20 years.

**Hansen says**

linearly over the period 2010-2030,

Smith also says that

Of the 35 reactors the IEA listed as “under construction” in mid-2008, a third of these had been “under construction” for 20 years or longer

Their evidence says

For example, about two thirds of the currently operating 440 reactors around the world came online during a 10 year period between 1980 and 1990. S

#### That was when we were focused on nuke power so not about now

#### Also that is negligable compared to how many would have to be built – we have

#### Obviously impossible – heres evidence indicating that 1 reactor would have to come up every six days and that assumes a 40 year timeframe but their evidence assumes a 20 year timeframe which means it would probably be 12 per day – that is comparatively more than their e

**Smith and Makhijani 6** \*Brice Smith is an assistant professor of physics at the State University of New York, Cortland, and the author of Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Change (2006). Arjun Makhijani is president of the Institute for Energy and Environmental Research in Takoma Park, Maryland, and the principal author of Nuclear Power Deception: U.S. Nuclear Mythology From Electricity “Too Cheap to Meter” to ‘‘Inherently Safe” Reactors (1999) [http://www2.econ.iastate.edu/faculty/bhattacharya/102H/nuclear1.pdf, “Nuclear is not the Way” 2006]

The most important consideration is how many nuclear plants would be needed to significantly reduce future CO2 emissions. A 2003 study by researchers at the Massachusetts Institute of Technology, The Future of Nuclear Power, considered a reference case in which 1,000 one-gigawatt (GW) nuclear plants would be in operation around the world by 2050. (A gigawatt is enough electricity to power a U.S. city of half a million.) Even with such an increase, however, the proportion of electricity supplied by nuclear power worldwide would rise only slightly, from about 16 percent in 2000 to about 20 percent in 2050. As a result, the number of fossil fuel power plants, and thus the amount of CO2 emissions, would continue to increase. A more serious effort to limit carbon emissions through the use of nuclear power would require a larger number of reactors. In Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Climate Change (2006), one of us used the same projected growth in electricity demand employed in the MIT report to estimate the number of reactors required simply to maintain the electricity sector’s CO2 emissions at their 2000 levels. **Some 2,500 one-GW nuclear plants would be needed by midcentury. To meet that goal, one plant would have to come online somewhere in the world every six days between 2010 and 2050.**

### 2NC Irreversible

#### Warming’s irreversible

**Solomon et al ‘10** Susan Solomon et. Al, Chemical Sciences Division, Earth System Research Laboratory, National Oceanic and Atmospheric Administration, Ph.D. in Climotology University of California, Berkeley, Nobel Peace Prize Winner, Chairman of the IPCC, Gian-Kasper Plattner, Deputy Head, Director of Science, Technical Support Unit Working Group I, Intergovernmental Panel on Climate Change Affiliated Scientist, Climate and Environmental Physics, Physics Institute, University of Bern, Switzerland, John S. Daniel, research scientist at the National Oceanic and Atmospheric Administration (NOAA), Ph.D. in physics from the University of Michigan, Ann Arbor, Todd J. Sanford, Cooperative Institute for Research in Environmental Science, University of Colorado Daniel M. Murphy, Chemical Sciences Division, Earth System Research Laboratory, National Oceanic and Atmospheric Administration, Boulder Gian-Kasper Plattner, Deputy Head, Director of Science, Technical Support Unit Working Group I, Intergovernmental Panel on Climate Change, Affiliated Scientist, Climate and Environmental Physics, Physics Institute, University of Bern, Switzerland Reto Knutti, Institute for Atmospheric and Climate Science, Eidgenössiche Technische Hochschule Zurich and Pierre Friedlingstein, Chair, Mathematical Modelling of Climate Systems, member of the Science Steering Committee of the Analysis Integration and Modeling of the Earth System (AIMES) programme of IGBP and of the Global Carbon Project (GCP) of the Earth System Science Partnership (ESSP) (Proceedings of the National Academy of the Sciences of the United States of America, "Persistence of climate changes due to a range of greenhouse gases", October 26, 2010 Vol 107.43: 18354-18359)

Carbon dioxide, methane, nitrous oxide, and other greenhouse gases increased over the course of the 20th century due to human activities. The human-caused increases in these gases are the primary forcing that accounts for much of the global warming of the past fifty years, with carbon dioxide being the most important single radiative forcing agent (1). Recent studies have shown that the human-caused warming linked to carbon dioxide is nearly irreversible for more than 1,000 y, even if emissions of the gas were to cease entirely (2–5). The importance of the ocean in taking up heat and slowing the response of the climate system to radiative forcing changes has been noted in many studies (e.g., refs. 6 and 7). The key role of the ocean’s thermal lag has also been highlighted by recent approaches to proposed metrics for comparing the warming of different greenhouse gases (8, 9). Among the observations attesting to the importance of these effects are those showing that climate changes caused by transient volcanic aerosol loading persist for more than 5 y (7, 10), and a portion can be expected to last more than a century in the ocean (11–13); clearly these signals persist far longer than the radiative forcing decay timescale of about 12–18 mo for the volcanic aerosol (14, 15). Thus the observed climate response to volcanic events suggests that some persistence of climate change should be expected even for quite short-lived radiative forcing perturbations. It follows that the climate changes induced by short-lived anthropogenic greenhouse gases such as methane or hydrofluorocarbons (HFCs) may not decrease in concert with decreases in concentration if the anthropogenic emissions of those gases were to be eliminated. In this paper, our primary goal is to show how different processes and timescales contribute to determining how long the climate changes due to various greenhouse gases could be expected to remain if anthropogenic emissions were to cease. Advances in modeling have led to improved AtmosphereOcean General Circulation Models (AOGCMs) as well as to Earth Models of Intermediate Complexity (EMICs). Although a detailed representation of the climate system changes on regional scales can only be provided by AOGCMs, the simpler EMICs have been shown to be useful, particularly to examine phenomena on a global average basis. In this work, we use the Bern 2.5CC EMIC (see Materials and Methods and SI Text), which has been extensively intercompared to other EMICs and to complex AOGCMs (3, 4). It should be noted that, although the Bern 2.5CC EMIC includes a representation of the surface and deep ocean, it does not include processes such as ice sheet losses or changes in the Earth’s albedo linked to evolution of vegetation. However, it is noteworthy that this EMIC, although parameterized and simplified, includes 14 levels in the ocean; further, its global ocean heat uptake and climate sensitivity are near the mean of available complex models, and its computed timescales for uptake of tracers into the ocean have been shown to compare well to observations (16). A recent study (17) explored the response of one AOGCM to a sudden stop of all forcing, and the Bern 2.5CC EMIC shows broad similarities in computed warming to that study (see Fig. S1), although there are also differences in detail. The climate sensitivity (which characterizes the long-term absolute warming response to a doubling of atmospheric carbon dioxide concentrations) is 3 °C for the model used here. Our results should be considered illustrative and exploratory rather than fully quantitative given the limitations of the EMIC and the uncertainties in climate sensitivity. Results One Illustrative Scenario to 2050. In the absence of mitigation policy, concentrations of the three major greenhouse gases, carbon dioxide, methane, and nitrous oxide can be expected to increase in this century. If emissions were to cease, anthropogenic CO2 would be removed from the atmosphere by a series of processes operating at different timescales (18). Over timescales of decades, both the land and upper ocean are important sinks. Over centuries to millennia, deep oceanic processes become dominant and are controlled by relatively well-understood physics and chemistry that provide broad consistency across models (see, for example, Fig. S2 showing how the removal of a pulse of carbon compares across a range of models). About 20% of the emitted anthropogenic carbon **remains in the atmosphere for** many **thousands of years** (with a range across models including the Bern 2.5CC model being about 19 4% at year 1000 after a pulse emission; see ref. 19), until much slower weathering processes affect the carbonate balance in the ocean (e.g., ref. 18). Models with stronger carbon/climate feedbacks than the one considered here could display larger and more persistent warmings due to both CO2 and non-CO2 greenhouse gases, through reduced land and ocean uptake of carbon in a warmer world. Here our focus is not on the strength of carbon/climate feedbacks that can lead to differences in the carbon concentration decay, but rather on the factors that control the climate response to a given decay. The removal processes of other anthropogenic gases including methane and nitrous oxide are much more simply described by exponential decay constants of about 10 and 114 y, respectively (1), due mainly to known chemical reactions in the atmosphere. In this illustrative study, we do not include the feedback of changes in methane upon its own lifetime (20). We also do not account for potential interactions between CO2 and other gases, such as the production of carbon dioxide from methane oxidation (21), or changes to the carbon cycle through, e.g., methane/ozone chemistry (22). Fig. 1 shows the computed future global warming contributions for carbon dioxide, methane, and nitrous oxide for a midrange scenario (23) of projected future anthropogenic emissions of these gases to 2050. Radiative forcings for all three of these gases, and their spectral overlaps, are represented in this work using the expressions assessed in ref. 24. In 2050, the anthropogenic emissions are stopped entirely for illustration purposes. The figure shows nearly irreversible warming for at least 1,000 y due to the imposed carbon dioxide increases, as in previous work. **All published studies to date**, which use multiple EMICs and one AOGCM, show largely irreversible warming due to future carbon dioxide increases (to within about 0.5 °C) on a timescale of at least 1,000 y (3–5, 25, 26). Fig. 1 shows that the calculated future warmings due to anthropogenic CH4 and N2O also persist notably longer than the lifetimes of these gases. The figure illustrates that emissions of key non-CO2 greenhouse gases such as CH4 or N2O could lead to warming that both temporarily exceeds a given stabilization target (e.g., 2 °C as proposed by the G8 group of nations and in the Copenhagen goals) and remains present longer than the gas lifetimes even if emissions were to cease. A number of recent studies have underscored the important point that reductions of non-CO2 greenhouse gas emissions are an approach that can indeed reverse some past climate changes (e.g., ref. 27). Understanding how quickly such reversal could happen and why is an important policy and science question. Fig. 1 implies that the use of policy measures to reduce emissions of short-lived gases will be less effective as a rapid climate mitigation strategy than would be thought if based only upon the gas lifetime. Fig. 2 illustrates the factors influencing the warming contributions of each gas for the test case in Fig. 1 in more detail, by showing normalized values (relative to one at their peaks) of the warming along with the radiative forcings and concentrations of CO2 , N2O, and CH4 . For example, about two-thirds of the calculated warming due to N2O is still present 114 y (one atmospheric lifetime) after emissions are halted, despite the fact that its excess concentration and associated radiative forcing at that time has dropped to about one-third of the peak value.

#### Triggers their impacts

**ANI 10** 3-2010, citing Charles H. Greene, Cornell professor of Earth and atmospheric science <http://news.oneindia.in/2010/03/20/ipcchas-underestimated-climate-change-impacts-sayscientis.html>

According to Charles H. Greene, Cornell professor of Earth and atmospheric science, "Even if all man-made greenhouse gas emissions were stopped tomorrow and carbon-dioxide levels stabilized at today's concentration, by the end of this century, the global average temperature would increase by about 4.3 degrees Fahrenheit, or about 2.4 degrees centigrade above pre-industrial levels, which is significantly **above** the level which scientists and policy makers agree is a threshold for dangerous climate change." "Of course, greenhouse gas emissions will not stop tomorrow, so the actual temperature increase will likely be significantly larger, resulting in potentially catastrophic impacts to society unless other steps are taken to reduce the Earth's temperature," he added. "Furthermore, while the oceans have slowed the amount of warming we would otherwise have seen for the level of greenhouse gases in the atmosphere, the ocean's thermal inertia will also slow the cooling we experience once we finally reduce our greenhouse gas emissions," he said. This means that the temperature rise we see this century will be largely irreversible for the next thousand years. "Reducing greenhouse gas emissions alone is unlikely to mitigate the risks of dangerous climate change," said Green.

#### **We are past the tipping points**

**Duarte 2/6**/12 Carlos, Director of Oceans Institute at the University of Western Australia, “Teetering on a tipping point” <http://theconversation.edu.au/teetering-on-a-tipping-point-dangerous-climate-change-in-the-arctic-5156>

We are seeing the first signs of dangerous climate change in the Arctic. This is our warning that humanity is facing a dire future. The Arctic region is fast approaching a series of “tipping points” that could trigger an abrupt domino effect of large-scale climate change across the entire planet. The region contains arguably the greatest concentration of potential tipping elements. If set in motion, these can generate profound alterations which will place the Arctic not at the periphery, but at the core of the Earth system. There is evidence that **these chain reactions have begun**. This has major consequences not just for “nature”, but for the future of humankind as the changes progress. Research shows that the Arctic is now warming at three times the global average. The loss of Arctic summer sea-ice forecast over the next four decades – if not before – is expected to have abrupt knock-on effects in northern mid-latitudes, including Beijing, Tokyo, London, Moscow, Berlin and New York. The loss of sea ice – which melted faster in summer than predicted – is linked tentatively to recent extreme cold winters in Europe. Arctic records show unambiguously that sea ice volume has declined dramatically over the past two decades. In the next 10 years, summer sea ice could be largely confined to north of coastal Greenland and Ellesmere Island, and is likely to disappear entirely by mid-century. Some environmental and biological elements, including weakening of the oceanic biological carbon pump and the thermohaline circulation, melting of the Greenland ice cap, thawing of Arctic permafrost and methane hydrate deposit, the decline of forest and peat fires in the boreal region, may be linked in a domino effect of tipping points that cascade rapidly once this summer sea ice is lost. Despite this danger, semantic confusion masquerading as scientific debate – although providing excellent media fodder – had delayed an urgent need to start managing the reality of dangerous climate change in the Arctic.

#### Positive Feedbacks

**Stern ’07** Nicholas Stern—Head of the British Government Economic Service—2007 (Former Head Economist for the World Bank, I.G. Patel Chair at the London School of Economics and Political Science, “The Economics of Climate Change: The Stern Review”, The report of a team commissioned by the British Government to study the economics of climate change led by Siobhan Peters, Head of G8 and International Climate Change Policy Unit, Cambridge University Press, p. 11-13.

Additional warming is already in the pipeline due to past and present emissions. The full warming effect of past emissions is yet to be realised. Observations show that the oceans have taken up around 84% of the total heating of the Earth’s system over the last 40 years36. If global emissions were stopped today, some of this heat would be exchanged with the atmosphere as the system came back into equilibrium, causing an additional warming. Climate models project that the world is committed to a further warming of 0.5° - 1°C over several decades due to past emissions37. This warming is smaller than the warming expected if concentrations were stabilised at 430 ppm CO2e, because atmospheric aerosols mask a proportion of the current warming effect of greenhouse gases. Aerosols remain in the atmosphere for only a few weeks and are not expected to be present in significant levels at stabilisation38. If annual emissions continued at today’s levels, greenhouse gas levels would be close to double pre-industrial levels by the middle of the century. If this concentration were sustained, temperatures are projected to eventually rise by 2 – 5ºC or even higher. Projections of future warming depend on projections of global emissions (discussed in chapter 7). If annual emissions were to remain at today’s levels, greenhouse gas levels would reach close to 550 ppm CO2e by 205039. Using the lower and upper 90% confidence bounds based on the IPCC TAR range and recent research from the Hadley Centre, this would commit the world to a warming of around 2 – 5°C (Table 1.1). As demonstrated in Box 1.2, these two climate sensitivity distributions lie close to the centre of recent projections and are used throughout this Review to give illustrative temperature projections. Positive feedbacks, such as methane emissions from permafrost, could drive temperatures even higher. Near the middle of this range of warming (around 2 – 3°C above today), the Earth would reach a temperature not seen since the middle Pliocene around 3 million years ago40. This level of warming on a global scale is far outside the experience of human civilisation. However, these are conservative estimates of the expected warming, because in the absence of an effective climate policy, changes in land use and the growth in population and energy consumption around the world will drive greenhouse gas emissions far higher than today. This would lead greenhouse gas levels to attain higher levels than suggested above. The IPCC projects that without interventiongreenhouse gas levels will rise to 550 – 700 ppm CO2e by 2050 and 650 – 1200 ppm CO2e by 210041. These projections and others are discussed in Chapter 7, which concludes that, without mitigation, greenhouse gas levels are likely to be towards the upper end of these ranges. If greenhouse gas levels were to reach 1000 ppm, more than treble pre-industrial levels, the Earth would be committed to around a 3 – 10°C of warming or more, even without considering the risk of positive feedbacks (Table 1.1).

#### Too late to solve warming—too much CO2

**Garnet ’10** (Andre Garnet, Senior Analyst at Investology, Inc. 8/14/10 , the energy collective, “Slowing CO2 emissions cannot end global warming, but removing CO2 from the atmosphere will”, http://theenergycollective.com/andre-garnet/41653/slowing-co2-emissions-cannot-end-global-warming-removing-co2-atmosphere-will)

Scarcely a day goes by without some announcement as to yet another effort to limit CO2 emissions, here or there, for the purpose of fighting global warming. Yet, all such attempts are futile given that so much CO2 has already accumulated in the atmosphere that even if we ended all CO2 emissions today, global warming would probably continue to increase unabated. However, as explained below, we do have the technology to extract CO2 from the atmosphere and it is due to inept thinking on the part of United Nations scientists that we are not applying it. Before going into details, it might be useful to frame the problem: It is since the advent of the industrial revolution circa 1,850 that factories and transportation caused a large and enduring increase in the amount of CO2 emissions. This phenomenon has been compounded by the rapid increase in the population given that humans emit CO2 as they breathe. As a result, an enormous quantity of CO2 has accumulated in the atmosphere given that we emitted more than could be absorbed by plants and by the sea. So much so, that the amount of new CO2 that we emit nowadays is a drop in the bucket compared to the quantity of CO2 that has already accumulated in the atmosphere since around 1,850 as the atmospheric concentration of CO2 increased by about 30%. It is this enormous quantity of atmospheric CO2 that traps the heat from the Sun, thus causing about 30% of global warming. The point is that, if we are to stop or reverse global warming, we need to extract from the atmosphere more CO2 than we emit. However, all we are currently attempting is to limit emissions of CO2. This is too little, too late and totally useless inasmuch it could reduce our CO2 emissions by only 5% at best, while achieving nothing in terms of diminishing the amount of atmospheric CO2. Rather than wasting precious time on attempts to LIMIT our CO2 emission, we should focus on EXTRACTING from the atmosphere more CO2 than we are emitting. We have a proven method for this that couldn't be simpler, more effective and inexpensive, so what are we waiting for? More specifically, it has been shown that atmospheric CO2 has been perhaps twice higher than now in the not too distant past (some 250,000 years ago.) So what caused it to drop to as low as it was around 1,850? It was primarily due to the plankton that grows on the surface of the sea where it absorbs CO2 that it converts to biomass before dying and sinking to the bottom of the sea where it eventually becomes trapped in sedimentary rock where it turns to oil or gas. There simply isn't enough biomass on the 30% of Earth's surface that is land (as opposed to sea) for this biomass to grow fast enough to soak up the excess atmospheric CO2 that we have to contend with. Plankton, on the other hand, can grow on the 70% of Earth that is covered by the sea where it absorbs atmospheric CO2 much faster, in greater quantities and sequesters it for thousands of years in the form of oil and gas. Growing plankton is thus an extremely efficient, yet simple and inexpensive process for removing the already accumulated CO2 from the atmosphere. All we need to do is to dust the surface of the ocean with rust (i.e. iron oxides) that serves as a fertilizer that causes plankton to grow. The resulting plankton grows and blooms over several days, absorbing CO2 as it does, and then about 90% of it that isn't eaten by fish sinks to the bottom of the sea. The expert Russ George calculated that if all ocean-going vessels participated in such an effort worldwide, we could return atmospheric CO2 concentration to its 1,850 level within 30 years. It's very inexpensive and easy to do, wouldn't interfere with the ships' normal activities and would, in fact, earn them carbon credits that CO2 emitters would be required to buy. Moreover it is the ONLY approach available for addressing global warming on the global scale that is necessary. By contrast, efforts to limit CO2 emissions by means of CO2 sequestration could address only about 5% of NEW CO2 generated by power plants. So even while causing our electricity costs to treble or quadruple, such efforts wouldn't remove any of the massive amount of CO2 already accumulated in the atmosphere. In fact, the climatologist James Hansen believes that even if we could stop all CO2 emissions as of today, it may already be too late to avert run-away, global warming as there is enough CO2 in the atmosphere for global warming to keep increasing in what he fears is becoming an irreversible process. In other words, atmospheric CO2 is trapping more heat than Earth can dissipate which causes temperature

### 1nc Resource Wars f/l

#### No Resource Wars – Three Reasons

* Trade
* Low Benefit
* Decline in nonrenewable costs

Deudney 99 – (Dan, Associate Professor of Political Science, Johns Hopkins, Contested Grounds: Security and Conflict in the New Environmental Politics, Eds. Deudney & Matthews p 205-6)

The hypothesis that states will begin fighting each other as natural resources are depleted and degraded seems intuitively accurate. The popular metaphor of a lifeboat adrift at sea with declining supplies of clean water and rations suggests there will be fewer opportunities for positive-sum gains between actors as resource scarcity grows. Many fears of resource war are derived from the cataclysmic world wars of the first half of the twentieth century Influenced by geopolitical theories that emphasized the importance of land and resources for great power status, Adolf Hitler fashioned Nazi German war aims to achieve resource autonomy. The aggression of Japan was directly related to resource goals: lacking indigenous fuel and minerals, and faced with a slowly tightening embargo by the Western colonial pow ers in Asia, the Japanese invaded Southeast Asia for oil, tin, and rub ber. Although the United States had a richer resource endowment than the Axis powers, fears of shortages and industrial strangulation played a central role in the strategic thinking of American elites about world strategy. During the Cold War, the presence of natural resources in the Third World helped turn this vast area into an arena for East-West conflict. Given this record, the scenario of conflicts over resources playing a powerful role in shaping international order should be taken seriously. However, there are three strong reasons for concluding that the familiar scenarios of resource war are of diminishing plausibility for the foreseeable future. First, the robust character of the world trade system means that states no longer experience resource dependency as a major threat to their military security and political autonomy. During the 1930s, the collapse of the world trading system drove states to pursue economic autarky, but the resource needs of contemporary states are routinely met without territorial control of the resource source. As Ronnie Lipschutz has argued, this means that re source constraints are much less likely to generate interstate violence than in the past. Second, the prospects for resource wars are diminished by the growing difficulty that states face in obtaining resources through territorial conquest. Although the invention of nuclear explosives has made it easy and cheap to annihilate humans and infrastructure in extensive areas, the spread of conventional weaponry and national consciousness has made it very costly for an invader, even one equipped with advanced technology, to subdue a resisting population, as France discovered in Indochina and Algeria, the United States in Vietnam, and the Soviet Union in Afghanistan. At the lower levels of violence capability that matter most for conquering and subduing territory; the great powers have lost effective military superiority and are unlikely soon to regain it. Third, nonrenewable resources are, contrary to intuitive logic, becoming less economically scarce. There is strong evidence that the world is entering what H. E. Goeller and Alvin M. Weinberg have labeled the “age of substitutability,” in which industrial technology is increasingly capable of fashioning ubiquitous and plentiful earth materials such as iron, aluminum, silicon, and hydrocarbons into virtually everything needed by modem societies. The most striking manifestation of this trend is that prices for virtually every raw material have been stagnant or falling for the last two decades despite the continued growth in world economic output. In contrast to the expectations widely held during the 1970s that resource scarcity would drive up commodity prices to the benefit of Third World raw material suppliers, prices have fallen.

#### Empirical Evidence

Salehyan 7 – Professor of Political Science at the University of North Texas. (Idean, 6-14 “The New Myth About Climate Change Corrupt, tyrannical governments—not changes in the Earth’s climate—will be to blame for the coming resource wars.” <http://www.foreignpolicy.com/articles/2007/08/13/the_new_myth_about_climate_change>)

First, aside from a few anecdotes, there is little systematic empirical evidence that resource scarcity and changing environmental conditions lead to conflict. In fact, several studies have shown that an abundance of natural resources is more likely to contribute to conflict. Moreover, even as the planet has warmed, the number of civil wars and insurgencies has decreased dramatically. Data collected by researchers at Uppsala University and the International Peace Research Institute, Oslo shows a steep decline in the number of armed conflicts around the world. Between 1989 and 2002, some 100 armed conflicts came to an end, including the wars in Mozambique, Nicaragua, and Cambodia. If global warming causes conflict, we should not be witnessing this downward trend. Furthermore, if famine and drought led to the crisis in Darfur, why have scores of environmental catastrophes failed to set off armed conflict elsewhere? For instance, the U.N. World Food Programme warns that 5 million people in Malawi have been experiencing chronic food shortages for several years. But famine-wracked Malawi has yet to experience a major civil war. Similarly, the Asian tsunami in 2004 killed hundreds of thousands of people, generated millions of environmental refugees, and led to severe shortages of shelter, food, clean water, and electricity. Yet the tsunami, one of the most extreme catastrophes in recent history, did not lead to an outbreak of resource wars. Clearly then, there is much more to armed conflict than resource scarcity and natural disasters

#### No risk of a conflict – countries share resources and it is not the root cause of any conflict

**Victor 07**— professor of law at Stanford Law School and the director of the Program on Energy and Sustainable Development. He is also a senior fellow at the Council on Foreign Relations (David, Nov 14, “What resource wars?” <http://www.atimes.com/atimes/Global_Economy/IK14Dj04.html>) Jacome

such as malaria that could be harder to contain if tropical conditions are more prevalent, which in turn could stress health-care systems and lead to hot wars.

While there are many reasons to fear global warming, the risk that such dangers could cause violent conflict ranks extremely low on the list because it is highly unlikely to materialize. Despite decades of warnings about water wars, what is striking is that water wars don't happen - usually because countries that share water resources have a lot more at stake and armed conflict rarely fixes the problem. Some analysts have pointed to conflicts over resources, including water and valuable land, as a cause in the Rwandan genocide, for example. Recently, the UN secretary-general suggested that climate change was already exacerbating the conflicts in Sudan.

But none of these supposed causal chains stay linked under close scrutiny - the conflicts over resources are usually symptomatic of deeper failures in governance and other primal forces for conflicts, such as ethnic tensions, income inequalities and other unsettled grievances. Climate is just one of many factors that contribute to tension. The same is true for scenarios of climate refugees, where the moniker "climate" conveniently obscures the deeper causal forces.

#### Their impacts are self-denying—states too weak to adapt to scarcity are also too weak to fight

Barnett 2k – Australian Research Council Fellow in the School of Social and Environmental Enquiry at the University of (Jon, Melbourne, Review of International Studies 26, April)

This brings us to a pervasive analytical difficulty of the literature which posits the possibility of environmentally induced conflicts. If, as Gleick suggests, ‘developing countries have far fewer technical and economic resources at their disposal’, and hence are less able to adapt to environmental change, then this institutional impoverishment surely applies to their ability to wage war as well.15 The threat from the South could scarcely manifest itself as large scale warfare, despite Gleick’s observation that ‘Third World arms capabilities are impressive and growing’ and so ‘the threat to peace and security becomes fully apparent’.16 There may indeed be some possibility of low-intensity conflict driven by desperation and resentment of the policies and practices of the North, but it is important to step back and view the broader picture. The revealing question is whose peace and security? The absolute peace and security problem is not that in the face of intolerable oppression the oppressed may resist; the problem is the oppression and injustice itself. The task, then, is to eliminate this injustice.

###  Exts – Globalization

#### No resource wars – global trading

**Allouche 10** – Research Fellow in water supply and sanitation. Institute of Development Studies, Brighton, (Jeremy, “The sustainability and resilience of global water and food systems: Political analysis of the interplay between security, resource scarcity, political systems and global trade” Food Policy (2010), doi:10.1016/j.foodpol.2010.11.013)

Debates on resource scarcity and conﬂict have ignored the role of trade in both causing and addressing local and regional shortages. In the case of food and water, this has led to conclusions that are highly questionable. Indeed, food security has essentially been addressed through national water availability and ignores the spectacularly successful beneﬁts of international trade, in this particular case food imports (Allan, 2001). Water availability is often hidden in international trade. Countries with more water are able to trade water-intensive goods for export. Water embedded in traded crops has been termed ‘virtual water’ and trade in virtual water has been suggested as a way to alleviate water shortages. However, the limit of this logic should be recognized in that global trade is based on broader political and economic factors rather than on water. Through global trade, one can observe an overall increase in terms of food security between 1970 and 1990. The greatest improvements were in North Africa and the Middle East, moderate change in Asia and Oceania and Latin America, and a decline in Sub-Saharan Africa. A number of specialists emphasize the need for free international trade in order to assure global food security, as it enables supply and demand to be balanced across regions (Godfray et al., 2010). Global trade therefore is seen as a solution to the ‘equality’ problem as it enables food security as deﬁned by the FAO (namely when ‘‘all people, at all times, have physical and economic access to sufﬁcient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life’’ – as deﬁned at the 1996 World Food Summit, FAO, 1996). Although it has been acknowledged that free markets usually penalize the poorest who have the least inﬂuence on how global markets are structured and regulated (see Anderson, 2009 and Aksoy and Beghin, 2005), alternatives have usually been dismissed.

#### Globalization

**Seng 2k** – MAJ (Ronnie Lim Gek, July, “Globalisation and Its Impact on Security in Southeast Asia” Journal of the Singapor Armed Forces, Journal V26 N3, <http://www.mindef.gov.sg/safti/pointer/back/journals/2000/Vol26_3/3.htm>)

The resource motivations for conquest in the past are less significant now that education, technology and the national manpower resource skills are more substantial sources of wealth. Although natural resources in some countries have contributed to immense wealth, the highly industrialised world today thrives on economies with a leading advantage in technological skills, financial stability, and good governance to bring in foreign investments. Globalisation has enabled the opportunity for an economy to be 'networked' with the external world where technological and economic activities abound. It is precisely the dependence on these very factors that Singapore, devoid of natural resources, has remained relatively unscathed during the financial crisis.  Going to war for the purpose of gaining resources is highly improbable, as governments contemplating to do so, would weigh the costs against the benefits to be reaped from an outright war. For example, Vietnam had been secure with oil freely available on the open markets and it is less costly and more efficient to gain resources through the market than through the conquest of another country. Consequently, as the country's 'wealth' is increasingly enshrined in the quality of its technology-based economy and stable governance, an inclination to declare war to gain resource becomes even more remote.

###  Exts – Empirics

#### No risk of resource wars

**Pinker 11**—Harvard College Professor, Johnstone Family Professor in the Department of Psychology at Harvard University (Steven, © 2011, The Better Angels of our Nature: Why Violence has Declined, RBatra)

Once again it seems to me that the appropriate response is “maybe, but maybe not.” Though climate change can cause plenty of misery and deserves to be mitigated for that reason alone, **it will not necessarily lead to armed conflict**. The political scientists who track war and peace, such as Halvard Buhaug, Idean Salehyan, Ole Theisen, and Nils Gleditsch, are skeptical of the popular idea that people fight wars over scarce resources.290 Hunger and resource shortages are tragically common in sub-Saharan countries such as Malawi, Zambia, and Tanzania, but wars involving them are not. Hurricanes, floods, droughts, and tsunamis (such as the disastrous one in the Indian Ocean in 2004) do not generally lead to armed conflict. The American dust bowl in the 1930s, to take another example, caused plenty of deprivation but no civil war. And while temperatures have been rising steadily in Africa during the past fifteen years, civil wars and war deaths have been falling. Pressures on access to land and water can certainly cause **local skirmishes, but a genuine war requires that hostile forces be organized and armed**, and that depends more on the influence of bad governments, closed economies, and militant ideologies than on the sheer availability of land and water. Certainly any connection to terrorism is in the imagination of the terror warriors: terrorists tend to be underemployed lower-middle-class men, not subsistence farmers.291 As for genocide, the Sudanese government finds it convenient to blame violence in Darfur on desertification, distracting the world from its own role in tolerating or encouraging the ethnic cleansing.

In a regression analysis on armed conflicts from 1980 to 1992, Theisen found that conflict was more likely if a country was poor, populous, politically unstable, and abundant in oil, but not if it had suffered from droughts, water shortages, or mild land degradation. (Severe land degradation did have a small effect.) Reviewing analyses that examined a large number (N) of countries **rather than cherry-picking one or two**, he concluded, “**Those who foresee doom, because of the relationship between resource scarcity and violent internal conflict, have very little support in the large-N literature**.” Salehyan adds that relatively inexpensive advances in water use and agricultural practices in the developing world can yield massive increases in productivity with a constant or even shrinking amount of land, and that better governance can mitigate the human costs of environmental damage, as it does in developed democracies. Since the state of the environment is at most one ingredient in a mixture that depends far more on political and social organization, resource wars are far from inevitable, even in a climate-changed world.

###  Exts – No Prolif

#### There’s no risk of prolif

#### First trends go neg

* **There have been the same number of nuclear weapons states since 40 years ago**
* **184 nations have forsworn nukes**
* **13 nations have stopped short and realized it was not worth it**
* **4 countries eliminated them**

#### Second our Allison evidence outlines specific countries and regions:

* **Japan doesn’t want to dabble in nuclear weapons – confident in umbrella and is still wary of their use**
* **South Korea knows the umbrella will help them**
* **Taiwan is too scared of china to start**
* **In the Middle east none of them have the infrastructure or they have special interests to not go nuclear**
* **Brazil has signed treaties preventing their nuclearizaation**

#### Prefer our claims – empirics and exaggeration.

Potter 8 and Mukhatzhanov– Sam Nunn and Richard Lugar Professor of Nonproliferation Studies and Director of the James Martin Center for Nonproliferation Studies at the Monterey Institute of International Studies and \*\* Research Associate at the James Martin Center (William C. and Gaukhar Mukhatzhanov, “Divining Nuclear Intentions: a review essay.” International Security, Vol. 33, No. 1 (Summer 2008), pp. 139–169, )

Today it is hard to find an analyst or commentator on nuclear proliferation who is not pessimistic about the future. It is nearly as difficult to and one who predicts the future without reference to metaphors such as proliferation chains, cascades, dominoes, waves, avalanches, and tipping points.42 The lead author of this essay also has been guilty of the same tendency, and initially named an ongoing research project on forecasting proliferation he directs “21st Century Nuclear Proliferation Chains and Trigger Events.” As both a thors proceeded with research on the project, however, and particularly after reading the books by Hymans and Solingen, we became convinced that the metaphor is inappropriate and misleading, as it implies a process of nuclear decisionmaking and a pace of nuclear weapons spread that are unlikely to transpire. The current alarm about life in a nuclear-armed crowd has many historical antecedents and can be found in classified National Intelligence Estimates (NIEs) as well as in scholarly analyses. The 1957 NIE, for example, identified a list of ten leading nuclear weapons candidates, including Canada, Japan, and Sweden.43 Sweden, it predicted, was “likely to produce its first weapons in about 1961,” while it was estimated that Japan would “probably seek to de- velop weapons production programs within the next decade.”44 In one of the most famous forecasts, President John Kennedy in 1963 expressed a nightmarish vision of a future world with afteen, twenty, or twenty-ave nuclear weap- ons powers.45 A number of the earliest scholarly projections of proliferation also tended to exaggerate the pace of nuclear weapons spread. A ourry of studies between 1958 and 1962, for example, focused on the “Nth Country Problem” and identified as many as twelve candidates capable of going nuclear in the near future.46 Canada, West Germany, Italy, Japan, Sweden, and Switzerland were among the states most frequently picked as near-term proliferators. The “peaceful nuclear explosion” by India in 1974 was seen by many ana- lysts of the time as a body blow to the young NPT that would set in motion a new wave of proliferation. Although the anticipated domino effect did not transpire, the Indian test did precipitate a marked increase in scholarship on proliferation, including an innovative study developed around the concept— now in vogue—of proliferation chains. Rarely cited by today’s experts, the 1976 monograph on Trends in Nuclear Proliferation, 1975–1995, by Lewis Dunn and Herman Kahn, set forth fifteen scenarios for nuclear weapons spread, each based on the assumption that one state’s acquisition of nuclear weapons would prompt several other states to follow suit, which in turn would trigger a succession of additional nuclearization decisions.47 Although lacking any single theoretical underpinning and accepting of the notion that proliferation de- cisions are likely to be attributed to security needs, the Dunn-Kahn model rejected the exclusive focus by realists on security drivers and sought to probe beneath the rhetoric to identify the possible presence of other pressures and constraints. To their credit, Dunn and Kahn got many things right and advanced the study of proliferation. Their forecasts, however, were almost without excep- tion wildly off the mark. Why, one may inquire, were their pessimistic projec- tions about nuclear weapons spread—and those of their past and subsequent counterparts in the intelligence community—so often divorced from reality? Although Hymans and Solingen appear not to have been familiar with the re- search by Dunn and Kahn on proliferation trends at the time of their books’ publications, their national leadership and domestic political survival models offer considerable insight into that dimension of the proliferation puzzle.48

#### Won’t happen – too expensive and controversial

Tepperman 9 – former Deputy Managing Ed. Foreig Affairs and Assistant Managing Ed. Newsweek (Jonathon, Newsweek, “Why Obama should Learn to Love the Bomb”, 44:154, 9-7)

The risk of an arms race--with, say, other Persian Gulf states rushing to build a bomb after Iran got one--is a bit harder to dispel. Once again, however, history is instructive. "In 64 years, the most nuclear-weapons states we've ever had is 12," says Waltz. "Now with North Korea we're at nine. That's not proliferation; **that's spread at glacial pace**." Nuclear weapons are so controversial and expensive that only countries that deem them absolutely critical to their survival go through the extreme trouble of acquiring them. That's why South Africa, Ukraine, Belarus, and Kazakhstan voluntarily gave theirs up in the early '90s, and why other countries like Brazil and Argentina dropped nascent programs. This doesn't guarantee that one or more of Iran's neighbors--Egypt or Saudi Arabia, say--might not still go for the bomb if Iran manages to build one. But the risks of a rapid spread are low, especially given Secretary of State Hillary Clinton's recent suggestion that the United States would extend a nuclear umbrella over the region, as Washington has over South Korea and Japan, if Iran does complete a bomb. If one or two Gulf states nonetheless decided to pursue their own weapon, that still might not be so disastrous, given the way that bombs tend to mellow behavior.

**No risk of breakout – fears of a tipping point are empirically overblown**

**Gavin 10** — Tom Slick Professor of International Affairs and Director of the Robert S. Strauss Center for International Security and Law, Lyndon B. Johnson School of Public Affairs, University of Texas at Austin (Francis, “Same As It Ever Was; Nuclear Alarmism, Proliferation, and the Cold War”, International Security, lexis)

Fears of a tipping point were especially acute in the aftermath of China's 1964 detonation of an atomic bomb: it was predicted that India, Indonesia, and Japan might follow, with consequences worldwide, as "Israel, Sweden, Germany, and other potential nuclear countries far from China and India would be affected by proliferation in Asia." 40 A U.S. government document identified "at least eleven nations (India, Japan, Israel, Sweden, West Germany, Italy, Canada, Czechoslovakia, East Germany, Rumania, and Yugoslavia)" with the capacity to go nuclear, a number that would soon "grow substantially" to include "South Africa, the United Arab Republic, Spain, Brazil and Mexico." 41 A top-secret, blue-ribbon committee established to craft the U.S. response contended that "the [1964] Chinese nuclear explosion has increased the urgency and complexity of this problem by creating strong pressures to develop independent nuclear forces, which, in turn, could strongly influence the plans of other potential nuclear powers." 42 These predictions were largely wrong. In 1985 the National Intelligence Council noted that for "almost thirty years the Intelligence Community has been writing about which nations might next get the bomb." All of these estimates based their largely pessimistic and ultimately incorrect estimates on factors such as the increased "access to fissile materials," improved technical capabilities in countries, the likelihood of "chain reactions," or a "scramble" to proliferation when "even one additional state demonstrates a nuclear capability." The 1985 report goes on, "The most striking characteristic of the present-day nuclear proliferation scene is that, despite the alarms rung by past Estimates, no additional overt proliferation of nuclear weapons has actually occurred since China tested its bomb in 1964." Although "some proliferation of nuclear explosive capabilities and other major proliferation-related developments have taken place in the past two decades," they did not have "the damaging, systemwide impacts that the Intelligence community generally anticipated they would." 43 In his analysis of more than sixty years of failed efforts to accurately predict nuclear proliferation, analyst Moeed Yusuf concludes that "the pace of proliferation has been much slower than anticipated by most." The majority of countries suspected of trying to obtain a nuclear weapons capability "never even came close to crossing the threshold. In fact, most did not even initiate a weapons program." If all the countries that were considered prime suspects over the past sixty years had developed nuclear weapons, "the world would have at least 19 nuclear powers today." 44 As Potter and Mukhatzhanova argue, government and academic experts frequently "exaggerated the scope and pace of nuclear weapons proliferation." 45 Nor is there compelling evidence that a nuclear proliferation chain reaction will ever occur. Rather, the pool of potential proliferators has been shrinking. Proliferation pressures were far greater during the Cold War. In the 1960s, at least twenty-one countries either had or were considering nuclear weapons research programs. Today only nine countries are known to have nuclear weapons. Belarus, Brazil, Kazakhstan, Libya, South Africa, Sweden, and Ukraine have dismantled their weapons programs. Even rogue states that are/were a great concern to U.S. policymakers--Iran, Iraq, Libya, and North Korea--began their nuclear weapons programs before the Cold War had ended. 46 As far as is known, **no nation has started a new nuclear weapons program since the demise of the Soviet Union** in 1991. 47 Ironically, by focusing on the threat of rogue states, policymakers may have underestimated the potentially far more destabilizing effect of proliferation in

### 1nc Proliferation f/l

#### No Prolif and at worst its slow – management issues

**Hymans 12** – is Associate Professor of International Relations at the University of Southern California (Jacques, May/June, “Botching the Bomb” <http://www.foreignaffairs.com/articles/137403/jacques-e-c-hymans/botching-the-bomb>) Jacome

[NUCLEAR DOGS THAT HAVE NOT BARKED](http://web.ebscohost.com.ezproxy.library.wisc.edu/ehost/detail?vid=3&hid=8&sid=7585163c-914e-4787-9fd6-b2e36f800b43%40sessionmgr12&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#toc)

"TODAY, ALMOST any industrialized country can produce a nuclear weapon in four to five years," a former chief of Israeli military intelligence recently wrote in The New York Times, echoing a widely held belief. Indeed, the more nuclear technology and know-how have diffused around the world, the more the timeline for building a bomb should have shrunk. But in fact, rather than speeding up over the past four decades, proliferation has gone into slow motion.

Seven countries launched dedicated nuclear weapons projects before 1970, and all seven succeeded in relatively short order. By contrast, of the ten countries that have launched dedicated nuclear weapons projects since 1970, **only three have achieved a bomb**. And only one of the six states that failed -- Iraq -- had made much progress toward its ultimate goal by the time it gave up trying. (The jury is still out on Iran's program.) What is more, even the successful projects of recent decades have needed a long time to achieve their ends. The average timeline to the bomb for successful projects launched before 1970 was about seven years; the average timeline to the bomb for successful projects launched after 1970 has been about 17 years.

International security experts have been unable to convincingly explain this remarkable trend. The first and most credible conventional explanation is that the Nuclear Nonproliferation Treaty (NPT) has prevented a cascade of new nuclear weapons states by creating a system of export controls, technology safeguards, and on-site inspections of nuclear facilities. The NPT regime has certainly closed off the most straightforward pathways to the bomb. However, the NPT became a formidable obstacle to would-be nuclear states only in the 1990s, when its export-control lists were expanded and Western states finally became serious about enforcing them and when international inspectors started acting less like tourists and more like detectives. Yet the proliferation slowdown started at least 20 years before the system was solidified. So the NPT, useful though it may be, cannot alone account for this phenomenon.

A second conventional explanation is that although the NPT regime may not have been very effective, American and Israeli bombs have been. Syria's nascent nuclear effort, for instance, was apparently dealt a major setback by an Israeli air raid on its secret reactor construction site in 2007. But the record of military strikes is mixed. Contrary to the popular myth of the success of Israel's 1981 bombing of the Osiraq reactor in Iraq, the strike actually spurred Iraqi President Saddam Hussein to move beyond vague intentions and commit strongly to a dedicated nuclear weapons project, which lasted until the 1990-91 Gulf War. Moreover, the bombs that the United States dropped on Iraq during that conflict mostly missed Saddam's nuclear sites.

Finally, some analysts have asserted that nuclear weapons projects become inefficient due to political leaders' flagging levels of commitment. But these analysts are reversing cause and effect: leaders lose interest when their nuclear programs are not running well. And some nuclear weapons projects, such as France's, have performed well despite very tepid support from above. The imperfect correlation between the commitment of leaders and the quality of nuclear programs should not be surprising, for although commentators may speak casually of "Mao's bomb" or "Kim Jong Il's bomb," the real work has to be carried out by other people.

[ARRESTED DEVELOPMENT](http://web.ebscohost.com.ezproxy.library.wisc.edu/ehost/detail?vid=3&hid=8&sid=7585163c-914e-4787-9fd6-b2e36f800b43%40sessionmgr12&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#toc)

A MORE CONVINCING explanation of the proliferation slowdown begins with the observation that during the early days of the nuclear age, most states with nuclear ambitions were in the developed world, whereas since the mid-1960s, most would-be nuclear states have been in the developing world. As proliferation has become a mainly developing-world phenomenon, timelines to the bomb have slowed down dramatically. But the relevant difference here is not primarily economic. Some nuclear programs in very poor states have fared rather well, such the one undertaken by famine-stricken China in the 1950s and 1960s. Conversely, wealthy oil states, such as Iraq and Libya, spent vast amounts on decades-long nuclear quests but still failed.

National income is only one dimension of development, however, and in this case it is not the most important one. As the political scientist Francis Fukuyama has stressed, despite strong rates of economic growth, most developing countries struggle to establish high-quality state bureaucracies. And a dysfunctional bureaucracy is likely to produce a dysfunctional nuclear weapons project.

Nuclear research and development organizations depend heavily on intense commitment, creative thinking, and a shared spirit of cooperation among large numbers of highly educated scientific and technical workers. To elicit this positive behavior, management needs to respect their professional autonomy and facilitate their efforts, and not simply order them around. Respect for professional autonomy was instrumental to the brilliant successes of the earliest nuclear weapons projects. Even in Stalin's Soviet Union, as the historian David Holloway has written, "it is striking how the apparatus of the police state fused with the physics community to build the bomb.… [The physics community's] autonomy was not destroyed by the creation of the nuclear project. It continued to exist within the administrative system that was set up to manage the project."

By contrast, most rulers of recent would-be nuclear states have tended to rely on a coercive, authoritarian management approach to advance their quest for the bomb, using appeals to scientists' greed and fear as the primary motivators. That coercive approach is a major mistake, because it produces a sense of alienation in the workers by removing their sense of professionalism. As a result, **nuclear programs lose their way**. Moreover, underneath these bad management choices lie bad management cultures. In developing states with inadequate civil service protections, every decision tends to become politicized, and state bureaucrats quickly learn to keep their heads down. Not even the highly technical matters faced by nuclear scientific and technical workers are safe from meddling politicians. The result is precisely the reverse of what the politicians intend: not heightened efficiency but rather a mixture of bureaucratic sloth, corruption, and endless blame shifting.

Although it is difficult to measure the quality of state institutions precisely, the historical record strongly indicates that the more a state has conformed to the professional management culture generally found in developed states, the less time it has needed to get its first bomb and the lower its chances of failure. Conversely, the more a state has conformed to the authoritarian management culture typically found in developing states, the more time it has needed to get its first bomb and the **higher its chances of failure.**

###  Exts – Inevitable

#### Now competitiveness is inevitable

#### First, on a pure economic scale the U.S. is far ahead – it spends more than the next four countries combined, is the leader in patents, and is the leader in high tech pharmaceuticals and aerospace products – that’s price

#### Prefer our evidence it cites objective facts rather than fear mongering scare tactics

#### Statistics

Galama and Hosek 08 –RAND Corporation, (Titus and James, “U.S. Competitiveness in Science and Technology,”, http://www.rand.org/pubs/monographs/2008/RAND\_MG674.sum.pdf)

We find that the United States continues to lead the world in science and technology. The United States grew faster in many measures of S&T capability than did Japan and Europe, and developing nations such as China, India, and South Korea showed rapid growth in S&T output measures, but they are starting from a small base. These developing nations do not yet account for a large share of world innovation and scientific output, which continues to be dominated by the United States, Europe, and Japan.

The United States accounts for 40 percent of total world R&D spending and 38 percent of patented new technology inventions by the industrialized nations of the Organisation for Economic Cooperation and Development (OECD), employs 37 percent (1.3 million) of OECD researchers (FTE), produces 35 percent, 49 percent, and 63 percent, respectively, of total world publications, citations, and highly cited publications, employs 70 percent of the world’s Nobel Prize winners and 66 percent of its most-cited individuals, and is the home to 75 percent of both the world’s top 20 and top 40 universities and 58 percent of the top 100.

#### Demographic shifts mean US economic dominance is inevitable

**Levingston 10** [Steven Levingston is a senior editor of The Washington Post Book World, “China is not likely to surpass United States as global economic superpower, new book predicts” Washington Post Jan 26]

In a book due out next month, the international futurist says China isn't likely to overtake the United States as the world's **economic superpower** in coming decades, countering predictions of some forecasters who believe the Chinese economy will be the global leader by 2020. In "The Next Hundred Million: America in 2050," Kotkin also projects that over the next 40 years the United States will not suffer as much as its global competitors from the burden of an aging population. Kotkin, a presidential fellow at Chapman University in Orange, Calif. and an adjunct fellow with the Legatum Institute in London, bases his forecasts largely on population trends, fertility rates and immigration patterns. He sees the U.S. population hitting at least 400 million by 2050, an increase of roughly 100 million from today. In his largely upbeat account, which will be published in February by Penguin, Kotkin argues that population growth will be a **boon to American prosperity, competitiveness and ingenuity**. He notes that increased numbers of Americans will place strains on the environment, the energy grid and city housing, but he believes the challenges will spur innovation and technological advancement. And a larger, more diverse population will **fuel America's future dominance**, Kotkin says. The U.S. fertility rate remains the highest of advanced countries, Kotkin writes, 50 percent higher than that of Russia, Germany and Japan. He projects that the Russian population will shrink by 30 percent by 2050 because of low birth and high mortality rates. The fertility rate in the United States also is well above the level in China, Italy, Singapore, Korea and almost all of eastern Europe. The U.S. population, Kotkin says, will enjoy the added benefit of continued large-scale immigration. "In advanced countries a rapidly aging or decreasing population does not bode well for societal or economic health," Kotkin writes, "whereas a growing one offers the hope of expanding markets, new workers, and entrepreneurial innovation." China is undergoing one of the most dramatic demographic shifts, Kotkin writes. Its one-child policy is pushing the country toward a rapidly aging population by 2050. The United Nations predicts that about 30 percent of China's population will be older than 60 by mid-century. "Some have predicted that China will become the world's largest economy as early as 2020," Kotkin writes, "but this ... is far from certain. Earlier predictions of eventual Soviet, European and Japanese preeminence, after all, proved staggeringly off the mark. ... [China's] lack of democratic institutions, its cultural homogeneity, its historic insularity, and the rapid aging that will start by the 2020s do not augur well for its global preeminence." Kotkin acknowledges that the United States will have to cope with its aging population in coming years, but its drag on resources will be less severe than in other countries. He says that a third or more of the populations in many European and East Asian countries will be over the age of 65 by 2050. By comparison, the over-65 set in the United States will make up a fifth of the population. Offsetting the aging population will be a millennial boomlet, as Kotkin calls it, between 2010 and 2020 when American baby boomers' children will be having kids. Kotkin's analysis of population trends indicates that nearly 50 percent of the U.S. population will be nonwhite by 2050, up from 30 percent today. The diversity will be an engine of dynamism, in Kotkin's view. "By midcentury the United States will be a predominantly 'white country' no longer but rather a staggering amalgam of racial, ethnic, and religious groups, all participants in the construction of a new civilization."

#### US is unmatched leader in tech

**Zakaria 9** [Fareed Zakaria, editor of newsweek and considered one of the most influential writers in the world “Is America Losing Its Mojo?,” 11/14/09 http://www.newsweek.com/id/222836]

By most measures, America remains the world leader in technological achievement. Consider the 2009 Nobel Prizes: of the 13 people honored, nine were American. Once you take out the economics, literature, and peace prizes, the United States, with 5 percent of the world's population, still won close to 70 percent of the awards. Even amid a terrible recession, the country still dominates the fields of information technology, life sciences, and nanotechnology, all **key industries of the future**. The World Economic Forum routinely cites America as having **the most competitive economy** on the planet (though this year it was narrowly overtaken by Switzerland). When decision makers are asked to rank countries on innovation, the United States always comes first by a large margin.

#### History proves even if there are short-term economic lags they’re reversible

**Lieber 8** [Robert J., Prof of Government at Georgetown “The Declinists Are Wrong Again” Perspectives Papers on Current Affairs, Perspectives 47 July 30, 2008, http://www.biu.ac.il/Besa/perspectives47.html]

A leitmotif of the 1980s was the success of the Japanese model ("Japan as #1") coupled with anxieties about American competitiveness. Also in the early 1980s, some strategists warned that a number of allied countries risked “Finlandization” as a result of Soviet pressure and the influence of domestic peace movements, and others cautioned that Soviet strategists might come to believe they could fight and win a nuclear war. In 1987, Paul Kennedy’s bestseller, The Rise and Fall of the Great Powers, implied that the cycle of rise and decline experienced most recently by Great Britain and brought to an end by “imperial overstretch” might foreshadow the fate of the United States. Yet by the end of the decade, the Cold War had ended, the Soviet Union was on the threshold of collapse, the Japanese economic engine had stalled, and the US economy was launched on a two decade period in which its growth rate, competitiveness and job creation would far outpace those of the Europeans and Japanese. Much of the new declinism seems propelled not only by arguments over real world events, but also by a fierce visceral reaction against the Bush presidency and its policies. For some, this antipathy at times seems to transcend concerns about the lethality of external threats, nuclear proliferation, and terrorism in the post-9/11 world. As with pessimistic assessments in reaction to the Depression of the 1930s, Vietnam, and the economic stagflation of the late 1970s and early 1980s, there is a tendency to over generalize from a momentous but singular event, in the present case the Iraq War. Much of the declinist case thus tends toward **over-emphasis on reversible phenomena.**

#### Addtionally their spending arguments are irrelevant – us is inevitable leader in competitiveness because of culture – yes their evidence might be right that China and India will have the scietists and capital to compete but that doesn’t necessitate innovation – many people plagiarize and the countries don’t focus on innovation – just end products

#### If hard number of scientists is their internal link then they cant solve

**Segal 11 —** Ira A. Lipman senior fellow for counterterrorism and national security studies at the Council on Foreign Relations (Adam, 27 July 2011, “The Great Invention Race,” http://www.foreignpolicy.com/articles/2011/01/27/the\_great\_invention\_race, RBatra)

America can't win the hardware race. There are simply too many people -- 2.3 billion people in India and China -- for the United States to compete when it comes to materials and labor. Given respective population size, China and India will one day have more skilled engineers than the United States, even if their quality doesn't match up now. Total U.S. spending on R&D ($395 billion in 2010) is currently more than two and a half times larger than Chinese expenditures ($141 billion), but that gap is rapidly shrinking.

But America can compete when it comes to software -- i.e., the ideas and innovation that are still out of reach for China's and India's more hidebound scientific and business communities. An important first step will be helping small start-ups. Small companies (those with fewer than 500 employees) generate about half of total employment in the United States; according to the Small Business Technology Council, they also employ more scientists and engineers than do large businesses and more than universities and federal labs combined. Specifically, as a recent study by the Kauffman Foundation shows, new small businesses are the ones creating these jobs. Since 1980 nearly all net job creation in the United States occurred in firms less than five years old; over the last four years, these young start-ups created two-thirds of all new jobs.

#### Here are recent investments that prove we are competitive

#### a.) Robotics

BW 11 (June 24, “National Robotics Roundtable Applauds President for Robotics Initiative,” http://www.businesswire.com/news/home/20110624005817/en/National-Robotics-Roundtable-Applauds-President-Robotics-Initiative,)

WASHINGTON--(BUSINESS WIRE)--Following President Obama’s visit today to the National Robotics Engineering Center at Carnegie Mellon University, organizations constituting the National Robotics Roundtable applauded the administration’s new manufacturing and robotics initiative and touted the role robotics and unmanned systems will play in creating jobs, strengthening the economy and ensuring American competitiveness in the global marketplace. The Administration’s National Robotics Initiative is part of a $500 million dollar project to boost America’s high-tech manufacturing sector. “We are pleased to welcome President Obama to Carnegie Mellon University today. **The steps** announced by the President **will advance U.S. leadership, spur new industries and create new jobs**,” said Jared L. Cohon, president of Carnegie Mellon University. “Robotics is at the heart of the race for 21st century global economic leadership, as current and emerging robotic innovations will become increasingly vital to keeping us healthy, safe and prosperous in the next decade and beyond. Now, more than ever, it’s important that industry, academia, and government work together to ensure our economic security and global competitiveness.” Robotics and unmanned systems have the potential to extend our human reach and expand our human capacity in a variety of industries, including manufacturing, defense and security, healthcare, transportation, agriculture and natural resource management. Meanwhile, robots are already at work addressing a number of our nation’s most critical needs, including reinvigorating the U.S. manufacturing base, protecting our citizens and soldiers, preserving our environment, making surgery less invasive, exciting our kids about math and science, and enabling people with disabilities to lead normal, productive lives. For example, U.S. doctors are currently utilizing sophisticated robotic devices to perform complex surgery using a minimally invasive approach, leading to a lower risk of infection, quicker recovery times and a shorter hospital stay. And a small wire basket manufacturer in Baltimore, MD that invested in robotics has seen its revenue increase six-fold, enabling them to expand (from 18 to 30 employees) and increase worker wages from $6 to $24 per hour. In an economy marked by importation, the company is exporting its products to the shores of China and 34 other countries. “Investing in robotics is more than just money for research and development, it is a vehicle to transform American lives and revitalize the American economy,” commented Helen Greiner, president and CEO of CyPhyWorks, president of the Robotics Technology Consortium, and co-founder of iRobot. “Indeed, we are at a critical juncture where we are seeing robotics transition from the laboratory to generate new businesses, create jobs and confront the important challenges facing our nation. The nation’s robotics community is collectively poised to advance the technology and at the same time accelerate the transition of these technologies from the lab into the market.” A number of recent man-made and natural disasters have further exemplified the new and emerging uses for robotics and unmanned systems. In the aftermath of Japan’s devastating earthquake and tsunami, robotic systems were used to inspect the damage at its Fukushima plant, a task too dangerous for humans. In the wake of the Deepwater Horizon explosion, unmanned underwater vehicles were deployed to contain the flow of oil into the Gulf of Mexico. Other unmanned systems have been deployed nationally to survey and help in search and rescue and control situations such as the Red River flood in North Dakota and the Southwest wildfires. Every day, robots and unmanned systems serve as eyes in the sky and perform dangerous tasks for our troops overseas, providing an extra level of protection in hostile and dangerous environments.

#### b.) Supercomputers

Goodwin and Zacharia, 11 – \*principal associate director of weapons and complex integration at Lawrence Livermore National Laboratory, AND \*\*deputy laboratory director for science and technology at Oak Ridge National Laboratory (6/23/11, Bruce, Zacharia, The Washington Post, “The Supercomputing Race,” http://www.washingtonpost.com/opinions/the-supercomputing-race/2011/06/22/AGou73hH\_story.html,)

China and Japan, of course, are not alone in recognizing the economic value of exascale computing. American computer companies are increasingly marketing their technologies to the growing number of nations, including India, South Korea, Germany, Russia and Australia, that have initiated aggressive, government-funded programs to deliver breakthroughs in supercomputing technology. These countries realize that exascale-class systems cannot be developed simply by refining existing technologies. Sustained research and development will be needed to overcome a variety of daunting technical challenges. Among these challenges is a ten-fold reduction in the amount of electricity required to power supercomputers. Without this reduction, future exascale-class systems would use hundreds of megawatts — enough to power a small city — at an annual cost of more than $100 million per system. An equally important challenge is for supercomputers to be “self-aware,” or instantly compensate for failures. Performing billions of simultaneous tasks will require that exascale machines have a high tolerance for component failure. Integrating these technologies, including low-power components, into consumer products such as cellphones and laptops would be an extraordinary economic opportunity for the nations that develop and bring them to the marketplace. The Energy Department is addressing these challenges with a national exascale initiative. The endeavor includes an effort to balance development of exascale technologies with efforts to integrate the new technologies into the economy. The initiative builds on partnerships among industry, the Energy Department and its national laboratories, and other agencies such as the National Science Foundation and the Defense Department, whose missions increasingly depend on high- performance computing. **The** goal of the **effort**, which **will** require substantial funding, is to **sustain America’s historic leadership in high-performance computing.**

###  Exts – Not Zero Sum

#### Not zero sum – in fact increased international competitiveness helps us, they don’t assume downstream development, other country’s innovations gives us more opportunities – our evidence cites empirics, the World Wide Web, and the tech for the Ipod, both were from outside the U.s. yet they dramatically increased our competitiveness

###  Exts – Inevitable

#### Hegemony is inevitable – there are multiple warrants isolated by Friedman

#### a.) Culture – it will dominate the world for the next 100 years which means we have extensive influence – their evidence is declinist fears

#### b.) Economy – the objective evidence proves our GDP is over 26% of the world’s economic activity, America has a larger economy of the next 4 countries combined, we produce most of the worlds energy, and have 3 times as much land mass for development compared to every other country

#### c.) Military –comparatively superior military – have a navy that is checking conflict at every single point in the world with satellites tracking challengers down

#### We have no challengers

* No Euro challenge
* No Russia challenge
* No South America Challenge

Mead 7/2 (Walter Russell Mead, BAMF, Mr. Mead is a professor of foreign affairs and humanities at Bard College and editor-at-large of the American Interest, “The Future Still Belongs to America”, <http://webcache.googleusercontent.com/search?q=cache:vH9Lgd7Ww6QJ:online.wsj.com/article/SB10001424052702304450604576419700203110180.html%3Fmod%3Dgooglenews_wsj+http://online.wsj.com/article/SB10001424052702304450604576419700203110180.html%3Fmod%3Dgooglenews_wsj&cd=1&hl=en&ct=clnk&gl=us&source=www.google.com>, July 2, 2011, LEQ)

Around the world we have no other real rivals. Even the Europeans have stopped talking about a rising EU superpower. The specter of a clash of civilizations between the West and an Islamic world united behind fanatics like the unlamented Osama bin Laden is less likely than ever. Russia's demographic decline and poor economic prospects (not to mention its concerns about Islamic radicalism and a rising China) make it a poor prospect as a rival superpower. When it comes to the world of ideas, the American agenda will also be the global agenda in the 21st century. Ninety years after the formation of the Communist Party of China, 50 years after the death of the philosopher of modern militant Islam Sayyid Qutb, liberal capitalist democracy remains the wave of the future. Fascism, like Franco, is still dead. Communism lingers on life support in Pyongyang and a handful of other redoubts but shows no signs of regaining the power it has lost since 1989 and the Soviet collapse. "Islamic" fanaticism failed in Iraq, can only cling to power by torture and repression in Iran, and has been marginalized (so far) in the Arab Spring. Nowhere have the fanatics been able to demonstrate that their approach can protect the dignity and enhance the prosperity of people better than liberal capitalism. The heirs of Qutb are further from power than they were during the first Egyptian Revolution in 1953. Closer to home, Hugo Chavez and his Axis of Anklebiters are descending towards farce. The economic success of Chile and Brazil cuts the ground out from under the "Bolivarean" caudillos. They may strut and prance on the stage, appear with Fidel on TV and draw a crowd by attacking the Yanquis, but the dream of uniting South America into a great anticapitalist, anti-U.S. bloc is as dead as Che Guevara. So the geopolitics are favorable and the ideological climate is warming. But on a still-deeper level this is shaping up to be an even more American century than the last. The global game is moving towards America's home court.

### AT: Perm (Do Both)

#### 1 - Links to the net benefit – our 1NC Barton evidence indicates the use of sodium is uniquely bad for reactor safety and is more vulnerable to leaks – means you should prefer the counterplan, which only uses lead-cooled reactors

#### 2 - The perm doesn’t capture our solvency - our Caldicott evidence indicates even a single accident would cause massive backlash and devastate the nuclear industry’s development – all reactors would get crushed and their case impacts become inevitable

### AT: Perm (Do CP)

#### 1 – We’ve got the only evidence on normal means – McFarlane indicates IFRs are cooled by sodium according to designs, and their plan text indicates they use the reactor in our evidence, which is distinct from lead-cooled reactors in the counterplan text

#### 2 – This means the aff severs out of an essential element of the plan text; severance is bad because it destroys ground by making the Aff a moving target and kills education because the Aff avoids all in depth discussion on alternatives to the plan

### AT: We don’t use Sodium

#### The IFR refers to a specific term of art that uses sodium

Argonne National Laboratory 12—government site of the ANL (1/13/12, New book tells history of Integral Fast Reactor, <http://www.ne.anl.gov/About/headlines/20120113.shtml>, RBatra)

The IFR was a pool-type reactor cooled by liquid sodium and designed to be proliferation-proof. It used metallic fuel and a closed fuel cycle that enabled the use of nearly 100 percent of the energy available from natural uranium. The full technology was successfully demonstrated at Argonne-West, the site formerly operated by Argonne on the site of what is now Idaho National Laboratory.

#### IFRs by definition use sodium

Green 08—writer at FOE Australia, citing experts in the nuclear field (Jim, no date given but latest cited is 2008, Integral Fast Reactors, <http://foe.org.au/anti-nuclear/issues/nfc/power/ifrs>, RBatra)

What are IFRs?

\* reactors proposed to be fuelled by a metallic alloy of uranium and plutonium

. 'Fast' because they use 'fast' unmoderated neutrons.

\* coolant - liquid sodium

\* electrolytic 'pyroprocessing' to separate actinides/transuranics (inc plutonium) from spent fuel and to re-irradiate (both as an additional energy source and to convert long-lived waste products into shorter-lived, less problematic radioactive wastes).

#### **IFRs are a design with a sodium-cooled reactor**

Green 08—writer at FOE Australia, citing experts in the nuclear field (Jim, no date given but latest cited is 2008, Integral Fast Reactors, <http://foe.org.au/anti-nuclear/issues/nfc/power/ifrs>, RBatra)

Barry Brook said: What I said was quite correct. IFRs cannot produce weapons-grade plutonium. The integral fast reactor is a systems design **with a sodium-cooled reactor** with metal fuels and pyroprocessing on-site. To produce weapons-grade plutonium you would have to build an IFR+HSHVHSORF (highly specialised, highly visible, heavily shielded off-site reprocessing facility). You would also need to run your IFR on a short cycle. For a nation state that only has IFRs, the very acts of short cycle operation and construction of a HSHVHSORF or Uranium enrichment facility would immediately flag the intention of producing weapons material, since there would be no other reason for doing this. For other nation states that have other nuclear capability, they can make bombs if they really want to anyway, and wouldn’t bother trying to do it with an IFR+HSHVHSORF.

#### **There’s a distinction between IFRs and Lead-Fueled reactors\*\***

Green 08—writer at FOE Australia, citing experts in the nuclear field (Jim, no date given but latest cited is 2008, Integral Fast Reactors, <http://foe.org.au/anti-nuclear/issues/nfc/power/ifrs>, RBatra)

Brook gives this summary of the state of development of IFR components: "IFRs are sodium-cooled fast spectrum nuclear power stations with on-site pyroprocessing to recycle spent fuel. Fast spectrum power reactors exist ... Indeed, even sodium-cooled fast reactors (a type of Advanced Liquid Metal Reactor, ALMR), the type an IFR facility would likely use, already exist (others include lead- or gas-cooled). Metallic alloy fuels (uranium-plutonium-zirconium), operating within a reactor, existed, in the Experimental Breeder Reactor II at the Argonne National Laboratory. Just because they are not currently used in any operating nuclear power plant doesn't mean they don't (haven't) existed). The only thing that doesn't currently exist is the full systems design of the integrated plant."

#### IFR only uses sodium

**Till et al 97** – Argonne National Laboratory

(C.E., with Y.I. Chang and W.H. Hannum, “THE INTEGRAL FAST REACTOR—AN OVERVIEW”, Progress in Nuclear Energy, Vol. 31, No 1/2, pp. 3-11, 1997, dml)

The Integral Fast Reactor (IFR) is a system that consists of a fast-spectrum nuclear reactor that uses metallic fuel and liquid-metal (sodium) cooling, coupled with technology for high-temperature electrochemical recycling, and with processes for preparing wastes for disposition. The concept is based on decades of experience with fast reactors, adapted to priorities that have evolved markedly from those of the early days of nuclear power. It has four essential, distinguishing features: efficient use of natural resources, inherent safety characteristics, reduced burdens of nuclear waste, and unique proliferation resistance. These fundamental characteristics offer benefits in economics and environmental protection. The fuel cycle never involves separated plutonium, immediately simplifying the safeguarding task. Initiated in 1984 in response to proliferation concerns identified in the International Nuclear Fuel Cycle Evaluation (INFCE, 1980), the project has made substantial technical progress, with new potential applications coming to light as nuclear weapons stockpiles are reduced and concerns about waste disposal increase. A breakthrough technology, the IFR has the characteristics necessary for the next nuclear age.

#### Your distinction from conventional reprocessing dooms you – our evidence indicates specifically that IFRs use sodium coolent

McFarlane 2002 (Harold, PROLIFERATION RESISTANCE ASSESSMENT OF THE INTEGRAL FAST REACTOR, [www.ipd.anl.gov/anlpubs/2002/07/43534.pdf](http://www.ipd.anl.gov/anlpubs/2002/07/43534.pdf) )

In the IFR concept, the fuel would be recycled on site using a technique that has at various times been known as pyroprocessing, electrometallurgical treatment or dry reprocessing. Completely different from aqueous reprocessing that has been industrialized as PUREX, pyroprocessing uses a molten salt in the separations process. Various mixtures of chloride or fluoride salts have been used, but all must operate in high temperature (450 C and up) and in a dry argon atmosphere. Other differences include much higher concentrations and volumes of plutonium due to reduced criticality limitations and very poor (<10) separation factors for plutonium relative to other actinides and some rare earths. Sodium and zirconium are compatible with the process, whereas they are not with conventional PUREX processes. Also, no minimum fuel cooling time is required, since there are no organic solvents to be destroyed by intense radiation.